

# THE IRON AGE

THURSDAY, JULY 19, 1888.

## The Iowa Distance Tariff.

The Jobbers' and Shippers' Association of Dubuque, Iowa, have been informed by the Iowa Railroad Commissioners that the new distance tariff for Iowa railroads

ers. Under the law the suits must be brought by the latter whenever a violation of the law is called to their notice. The penalty for the first offense is a fine of not less than \$1000 nor more than \$5000; for each subsequent violation not

## Turbines at the Terni Steel Works.

Turbines, with vertical or horizontal axes after the Girard system, have for some time been employed in preference to those of other systems wherever the quanti-

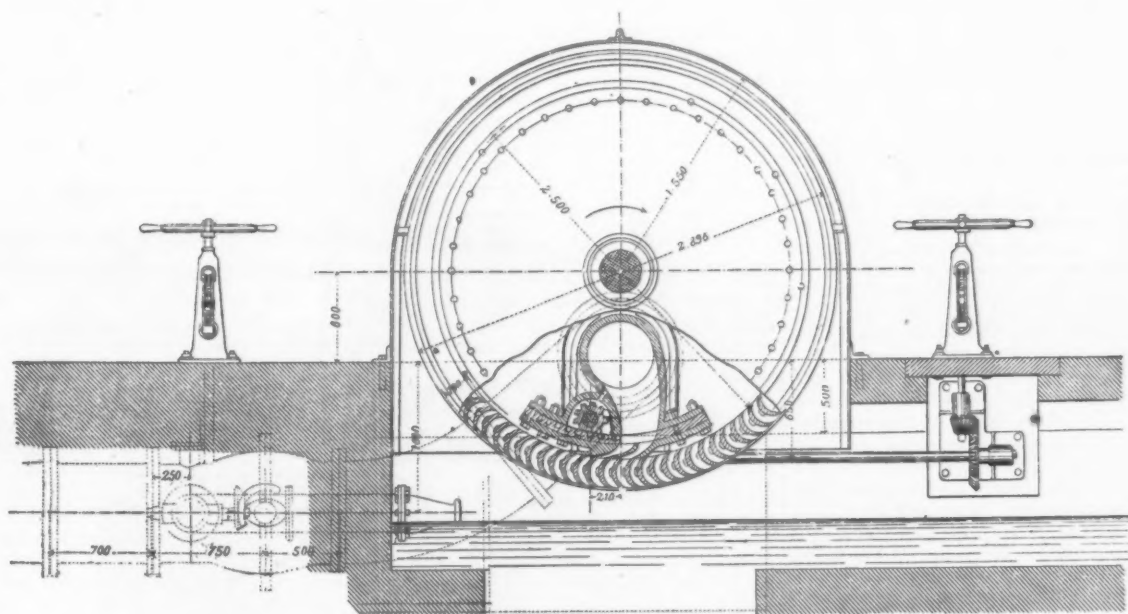


Fig. 1.—Elevation.

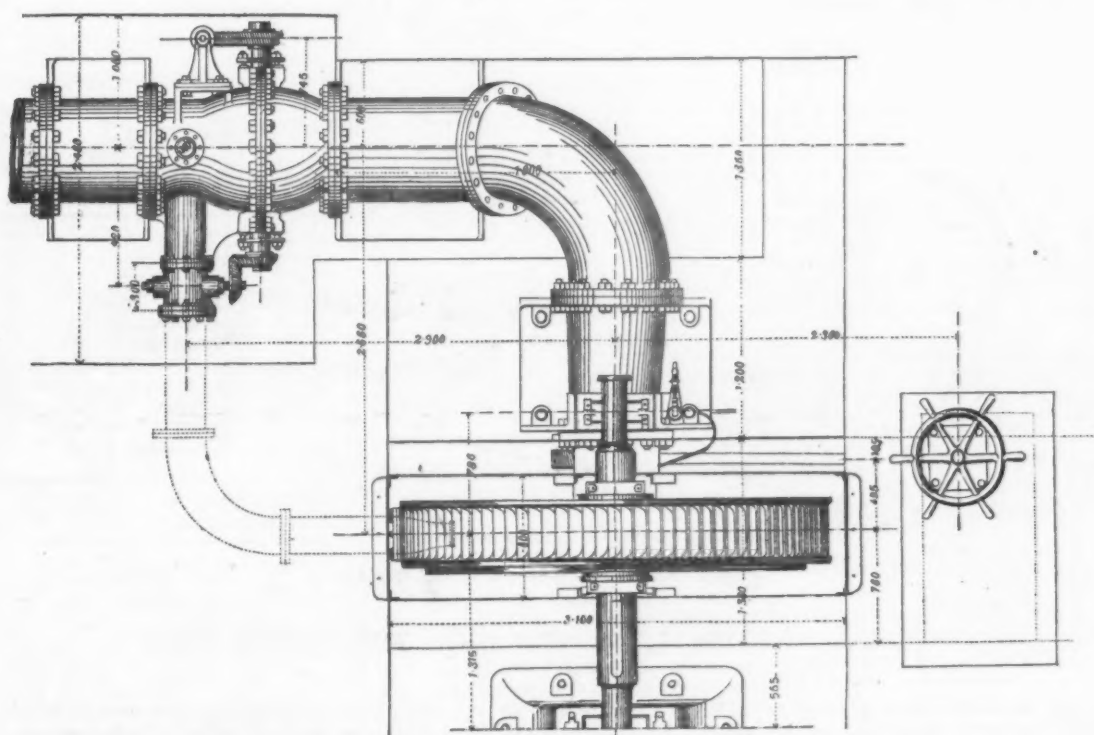


Fig. 2.—Plan.

## VERTICAL TURBINES AT THE TERNI STEEL WORKS, TERNI, ITALY.

went into effect on the 10th inst., notwithstanding the intervention of the courts invoked by the railroads. As a consequence, the Dubuque shippers now announce their purpose to prosecute any company making a freight charge in excess of the rate fixed by the Commission-

less \$5000 nor more than \$10,000. The Commissioners may dismiss suits with the consent of the Attorney General of the State. The officers of a railway company making excessive charges may also be indicted and the penalty recovered by criminal prosecution.

ties of water to be utilized are variable, where the height of fall to be utilized is constant and the lower level of water consequently does not rise or vary. A certain number of these turbines has been set up at steel works at Terni, Italy, by the constructors, M. M. J. J. Rieter & Co., of

Winterthur, Switzerland, to furnish the motive power required. These motors work the following machines:

Designation of the machines and apparatus.	Motive power in horse-power.	Quantity of water, liters per second.	Revolutions per minute.	Diameter of the turbines met's
General rolling mill.	1,000	500	180 to 240	2.400
Mill for rails.	800	450	200	2.500
Mill for tires.	500	280	240	1.800
Train of 500 mm. mill	350	200	200	2.500
Train of 280 mm. mill	150	85	250	1.950
Movable crane.	50	28	850	0.565
Great pump.	50	28	850	1.070
Great shears.	40	24	450	1.070
Mill for iron plate.	40	24	450	0.800
Small pump.	30	17	600	1.070
Small shears.	20	12	450	.....

The total amount of motive force is equal to 3030 horse-power, and the quantity of water corresponding with this is 1708 liters per second. The turbines of the steel works of Terni may be divided into two principal groups: 1. The small motors of 20 to 50 effective horse-power, which are mounted on a cast-iron frame, and can be removed and attached to the machines to be set in motion as required. 2. The great motors, each placed separately on masonry and concrete foundations.

The engravings which we publish and for which we are indebted to *Les Annales Industrielles*, show one of these great motors. This turbine works a mill for the production of railway rails; its force is equal to 800 horse-power. There are guides bolted on to a large pipe, which is fixed to a solid foundation, and from which a water-pipe branches on the opposite side to the distributing apparatus. This pipe is 600 mm. in diameter inside, and allows for a discharge of 450 liters per second. The head of water is 180 m., equivalent to about 270 pounds on the square inch. In order to resist this great pressure, the

cently above the ground to permit its being easily worked. The motion of this wheel is transmitted by means of bevel gear to a cog-wheel, which is placed in the interior of the sluice, and the advance or recoil of the latter is thus produced. Figs. 4 and 5 represent the sluice and a part of the wheel on a larger scale than that of the whole turbine. The distribution apparatus is furnished with two admission orifices, by which 0.345 m. of water can be introduced. The radial

quickly stopped and set in motion again. The high pressure brought to bear upon the distributing apparatus would not have permitted this quick arrest and restart without a very complicated disposition of the sluice. For this reason the admission valve is only employed in exceptional cases, and the sluice is worked by means of the wheel previously described, and which can be managed by a single man. But in order to avoid damaging shocks to the pipes when the admission is abruptly

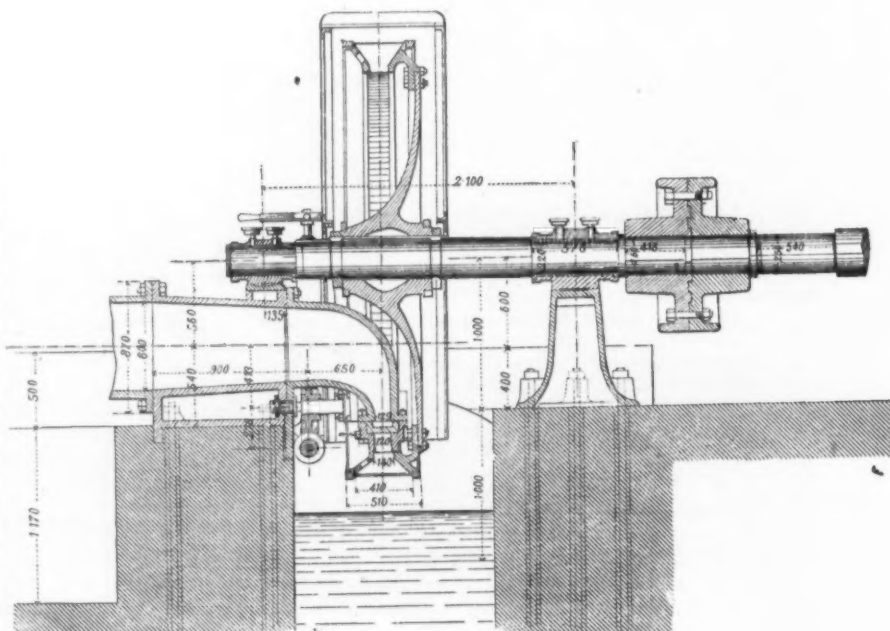
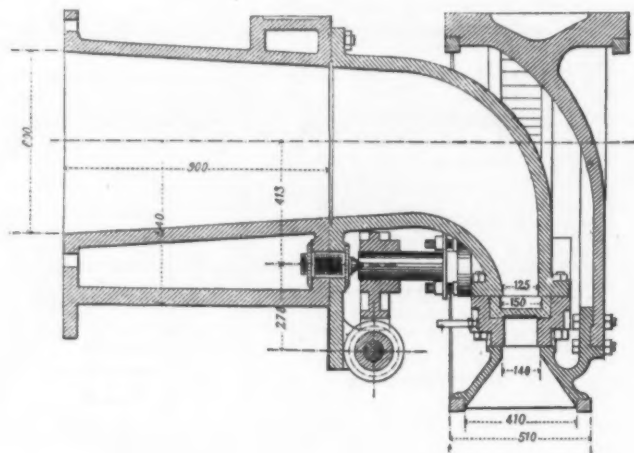
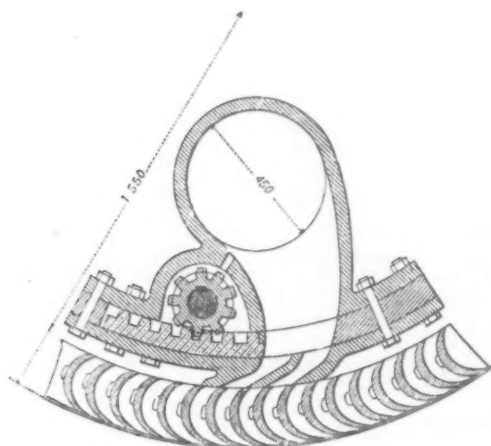


Fig. 3.—Cross Section.



Figs. 4 and 5.—Detail of Guide and Buckets.

#### VERTICAL TURBINES AT THE TERNI STEEL WORKS, TERNI, ITALY.

thickness of the water-pipe, as well as those of the movable wheel and of the fixed guide-wheel, is considerable. The interior diameter of the movable wheel is 2.5 m., and it makes 200 revolutions per minute, so that it has had to be constructed with great care.

Referring to the resistance of the wheel-rim to the centrifugal force which is developed, it should be noted that the cast iron employed for the wheel is very hard; the rim of the wheel is further strengthened by two steel rings welded up and shrunk on. It is united to the boss by a stout disk, so that the whole constitutes a very massive construction. The admission is regulated by a hand-wheel placed suffi-

ciently above the ground to permit its being easily worked. The motion of this wheel is transmitted by means of bevel gear to a cog-wheel, which is placed in the interior of the sluice, and the advance or recoil of the latter is thus produced. Figs. 4 and 5 represent the sluice and a part of the wheel on a larger scale than that of the whole turbine. The distribution apparatus is furnished with two admission orifices, by which 0.345 m. of water can be introduced. The radial

It is important to the efficiency of the mill that the turbine should be easily and

shut off a pipe has been placed in front of the large valve, which contains a smaller one. These two valves are united together by a gearing, so that the opening of the one causes the closing of the other, and vice versa, and there is no fear, therefore, of a rupture of the water pipe. The necessary quantity of water to work these turbines is brought by a long canal through two tunnels. The interior diameter of the pipes is 770 mm.

The spirit of opposition to all corporate power is seen in the passage by the House of a general land forfeiture bill, as a substitute for one previously passed by the Senate of a less sweeping character.



### The Mission of Mechanical Engineering Schools.\*

In a paper read last month before the American Society of Mechanical Engineers, one of the members who has practically contributed to the progress of the printing press, presents "A Plea for the Printing Press in Mechanical Engineering Schools." It is an honest plea, courteously uttered, and with an evident desire in no way to disparage the value of the training secured in engineering schools. The writer maintains that while the printing press shares perhaps alike with the steam engine, the fame as a great civilizer, no attention is given to it in any specific way in the leading engineering schools; that no books relating to it are studied or referred to; no lectures delivered detailing its mechanism; that its factories are not inspected by the students, and that no sample machines adorn the schools' laboratories of engineering. All this is inferred by the writer from a perusal of the catalogues. Usually judgment as to the course of studies pursued, if based solely on the catalogues themselves, is a dangerous procedure, apt to lead to fatal errors, but in this case no mistake is made, for it is a fact that the printing press receives but little, if any, attention in the engineering schools.

What should be the relation of the course of study pursued in the schools of mechanical engineering to these ever increasing important industrial engineering applications?

Should every new, important mechanical device, especially if it brings with it new fields of practical employment and labor for the engineer, immediately find its place as a study in the engineering school?

If this be so, the school of mechanical engineering will have to extend its term of study an indefinite extent, and ere long it will come to pass that the young student, entering as a beardless youth, will graduate from the school as a gray-haired man in the decline of life. For, surely, if every important machine is to be the subject of special study in the technical school, a lifetime will only suffice to cover the ground. And the result?

The result would be that the engineering schools would be of no use to the world, for the world's engineering work would be being done by outsiders, while the gray-haired students, plodding along, would be kept busy studying this very work and not be active agents in its development. It is the mission of the technical school to inculcate the principles of engineering, to train and mature the powers of observation and mechanical judgment, and, after teaching the laws of physics and mechanics, to give the ability to apply these laws to problems arising in machinery and the industrial arts. The special machines and appliances dwelt upon in the school should serve this one purpose; a knowledge of them should not be the end, but the means. Because we can best inculcate and supplement a correct understanding of the physical laws and a knowledge of how to apply them to the design of machinery by studying the successful applications made, therefore such study should form an important factor in the course of the technical school.

These engines, motors, machines, factories and engineering works should serve as the constant tests and checks of the student's efforts at individual design. When the student has once acquired the ability to put physical principles and experimental data into the best engineering forms, bearing in mind economy of material, with least sacrifice of strength, best method of handling, management and the like, he

comes equipped to struggle with new machines of which he has had no previous special knowledge. The school cannot give to the student all this desirable latent power, or stored energy, for much of it must come in later life from individual, unaided effort; and the experiences of daily application (often coupled with some degree of failure) must be the teachers which never leave the side of the devotee of engineering science. But these teachers are most efficient, if the student has been trained in the engineering school both and ever to reason before beginning work, and to check his previous reasoning by the results secured.

If we regard the technical school from this aspect, it is plain why the various prime movers play so important an element in the course of instruction, to the disadvantage of other possibly equally important machines. They are the most direct applications of very important and leading laws of physics, and the intelligent discussion of the prime movers calls for quite a knowledge of these laws, both in experimental and mathematical form. The problems of mechanics are splendidly embodied in the design of the various parts, and in many diverse ways, modified as is the application by the strains to which the parts are submitted, the strength of the materials and the practical methods of their working. Every conceivable strain, simple and compound, since it enters the working of the steam engine, for instance, comes up for consideration, while all the leading materials enter its construction. The prime movers act as fine checks on the student's individual efforts at design, for they represent the embodiment of centuries of application and development by the best engineering talent. They give opportunity for experimental verification of the laws of physics and mechanics as well.

I fully appreciate the view that it is commendable, indeed desirable, that the students, when graduating from technical schools, should possess some general knowledge of the leading machines in the market, but the first essential thing is that they should have acquired the ability to be useful workers in every field, by being possessed of a knowledge of the principles and methods of procedure which underlies all engineering works and machines and their design.

It has occurred to me that some of the theoretical preparatory studies pursued, such as mathematics, physics, chemistry and the like—and I purposely omit languages, belles-lettres, and those general academic branches having a less intimate connection with the engineering course—seem not to be carried out in some particulars so as to secure the highest efficiency from an engineering point of view.

Let me call your attention to this point: Is it not remarkable that essentially the same text-books on physics, chemistry, analytical mathematics, descriptive geometry and the like are studied at engineering schools as at the ordinary academic course of a university? Does not this fact of itself almost imply that the studies, as pursued, are not made to specially adapt themselves to the needs of the applied studies of the engineer? Could not some abstract developments, now dwelt upon at length, be advantageously omitted, while physical experiments and applications in heat, electricity and the like be more copiously introduced as exercises, both with the view of imparting a thorough hold on the abstract taught, and also as imparting requisite useful information and methods of procedure? It is my opinion that, in the application of mathematics to physical problems, even the mathematician, and certainly the engineer, can best test and master a knowledge of the mathematics themselves. How common is the experi-

ence of those who, having acquired in the usual way, even from the best of masters, what they considered a pretty fair hold on calculus—and this embraces the experience of many gifted students—when they tried to apply this knowledge in the study of the mechanical theory of heat, they found they really had no thorough grip on the calculus as they had presumed, and had, in fact, to start anew, with a decided loss of time, which might, it seems to me, have been avoided.

I concede the value as fully, and am as anxious as any one to guard the pursuit of knowledge in the abstract on its own account. Still, I say, why not in plane, solid, descriptive and analytical geometry, and in calculus and other analytical mathematics, gain some time now devoted to the elucidation of abstract propositions and detailed elaborations in various forms of the same propositions, of no direct value, and some time now devoted to applications, which, designed to test the understanding, are really essentially numerical substitutions, so as to find leisure to supply physical problems as a test. The latter problems best serve to call forth a true knowledge of the principles. It is only in such application that we discover whether we have really grasped and actually secured the full meaning of the principle. So, too, in the course of physics, as pursued in mechanical-engineering schools, some details now studied, from force of habit and as being the regular thing in a complete course of physics, might, it appears to me, be advantageously omitted and replaced by special and more extended work in heat, electricity, elasticity and the like.

### Anti-Corrosive Propeller Blades.

According to recent English accounts Mr. John Willis, of the firm of John Willis & Co., Specialty Steel Works, at Attercliffe, claims to have discovered a new method of preserving iron and steel propellers, blades, &c., from corrosion. Seagoing engineers and shipowners know that corrosion sets in very quickly upon the back of propeller blades, and to a greater extent in steel than in cast iron. The first cost of manganese bronze or gun-metal blades weighs seriously with shipowners; and it is, therefore, of the highest importance to look to the improvement of iron and steel blades. Mr. Willis's invention consists in a coating of copper united to the casting. This is effected by the copper plate, properly bent to shape, being placed in and forming part of the mold into which the iron or steel is poured, with the result that the copper is firmly united by fusion to the iron or steel face. All anti-corrosive metals are covered by the patent. Several of these are now undergoing tests to ascertain the most suitable for this purpose. Specimens of steel and copper united in this manner have been exhibited. There appears to be a perfect joint, the steel and copper being fused together and thoroughly united. It may be added that the blades can be totally coated if considered desirable.

The Hibernia Works, of Sheffield, announce, under date of July 2, that Albert Marples has retired from the business, and that it has been arranged that Harry Edgar Marples and Edward Albert Marples, sons of the senior partner, shall be taken into the firm, which will be conducted under the firm of William Marples & Sons, as heretofore.

If carried into execution, the contemplated improvements of the Point Breeze, N. J., company, will secure for business purposes extensive piers and basins to be excavated from the mud flats on the New Jersey shore.

\* From Presidential Address delivered before the Alumni Association of Stevens Institute of Technology, June 13, 1888, by A. R. Wolff

### JOINTS OF PIPES AND FITTINGS.

It is a noticeable fact that with the general and increasing use of pipes the question of joints has been little discussed, and the methods of making joints have remained almost unchanged. The cast-iron hub and spigot joint, Fig. 1, caulked with iron borings, is probably the oldest kind of joint. This is still generally adopted in hot-water heating of

and the use of a gasket of rubber, copper, paper or cement, with bolts for drawing the faces together. These joints for cast-iron pipes have not been changed excepting for some classes of work where a lip and recess, Fig. 3, is formed on opposite flanges, which make the internal surfaces smooth and aid in preventing the gaskets from being blown out.

In wrought-iron pipe work the general practice in making joints between pipes

pipe, and the internal projection of the thickness of the pipe and that of the thread of the fitting increases materially the friction due to the interior surfaces of pipe and fitting. This class of joint requires care in the tapping of the fittings and in the cutting of tapered threads on the pipes, and much trouble is caused by an inaccurately cut thread, as it may throw a line of pipes several inches out of place and put fittings and joints under undue and

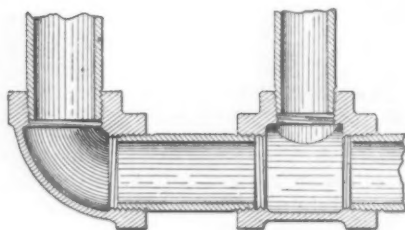


Fig. 5.

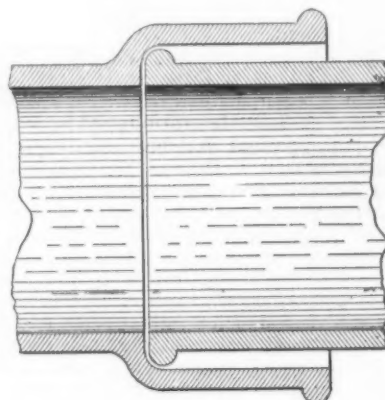


Fig. 1.

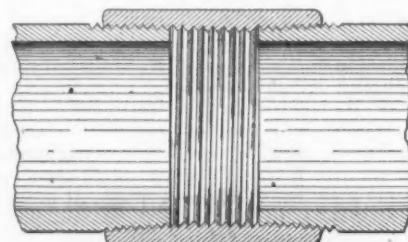


Fig. 4.

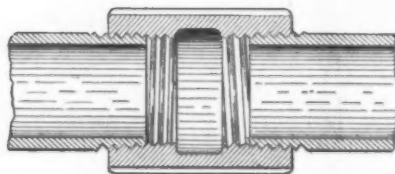


Fig. 6.

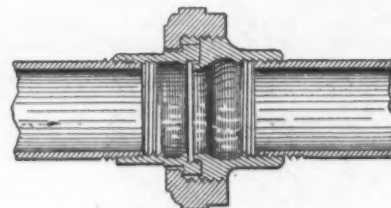


Fig. 7.

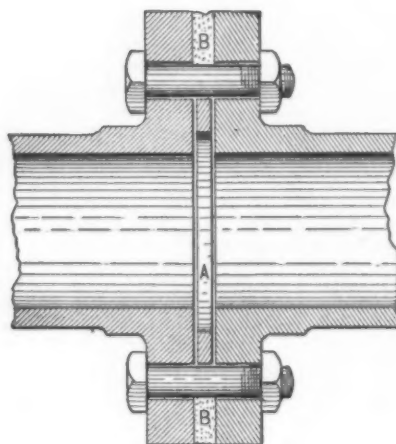


Fig. 2.

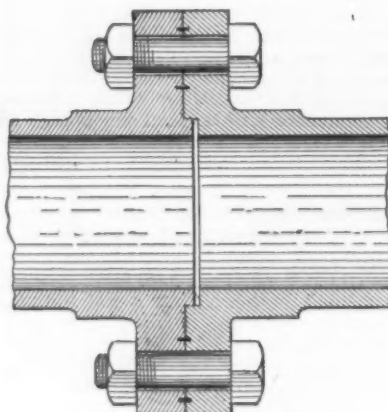


Fig. 3.

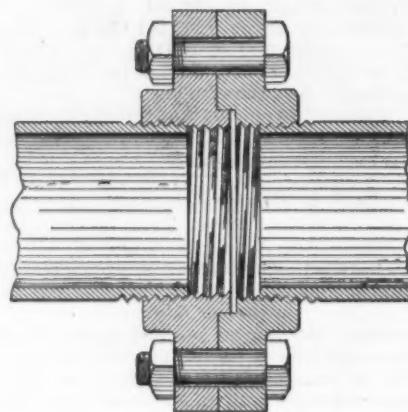


Fig. 8.

### JOINTS OF PIPES AND FITTINGS.

a certain class, and was formerly used with low-pressure steam. A fairly regular smooth internal surface is obtained, and once made tight, is very durable. Cast-iron flanged pipes have also been a long time in use. These joints were first made with a wrought-iron ring gasket, wrapped closely with yarn, A, Fig. 2, which was sometimes dipped in a mixture of red and white lead. It was then placed between the flanges, it being of such a diameter as to fit within the bolts by which the joint was screwed up and a nest or iron joint, B B, caulked outside the annular gasket between the faces of the flanges. The next step in cast-iron flange pipe-joints was the facing or turning up of the flanges

is a wrought-iron coupling, Fig. 4, with tapered threads at both ends. These couplings are liable to extend or expand under the internal pressure of the tapered end of pipe while being screwed in, to prevent which heavy cast-iron couplings or flanges are used in certain classes of work. The pipes do not meet at their ends, and a recess of about  $\frac{1}{4}$ -inch or more long by the depth of the thickness of the pipes is left at every pipe end. A similar tapered thread is used in connecting the cast-iron fittings, elbows, tees, &c., Fig. 5, to the pipe, and a large recess is necessary in each fitting to allow for the tapping of the threads. Thus the inside diameter of the fitting is larger by  $\frac{1}{4}$  inch than the outside diameter of the

irregular strains. The right and left threaded nipple, Fig. 5, is used as a finishing connection joint and between fittings. To make up this joint time and care are necessary, and even then its tightness is problematical until tested. The right threaded end on nipple should be first firmly screwed with the tongs or wrench into the right threaded end of fitting, then slacked out and screwed up again by hand until tight, when it is screwed back by hand, at the same time counting the number of threads it has entered by hand. The same is done with the left threaded end of nipple and fitting. If the right and left threads of nipple have counted the same number of threads, each



thread, when making the joint up, should enter the fittings at the same time if possible, and particular care must be taken that the fittings are exactly opposite, to facilitate catching on, prevent crossing threads, and that no irregular strain comes on the nipple while being screwed up. If these joints leak when tested and if screwed in further when warm, or after being treated when cold, the joints of both threads are not always certain to tighten up equally and at the same time. The right and left coupling, Fig. 6, involves the same amount of work and care.

The long screw-nipple, with coupling and faced lock-nuts, is another method of joining pipes and fittings. It consists of a nipple with a long parallel thread on one end, of sufficient length to receive coupling and nut, the other end having a short tapered thread, which is screwed into the

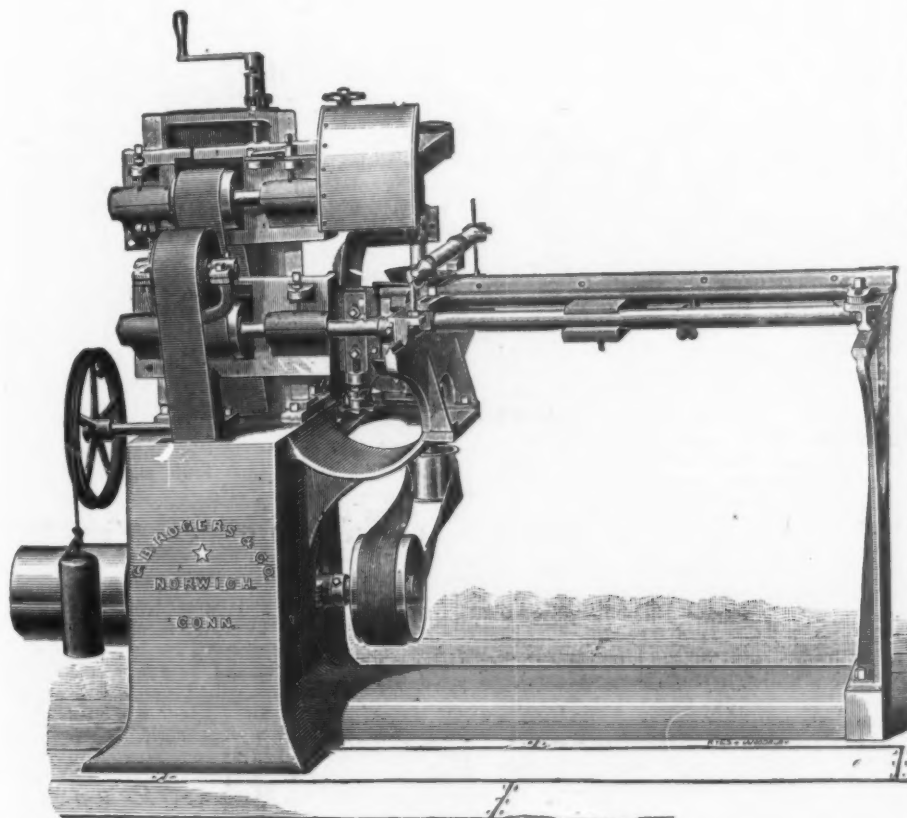
time is occupied in counting, fitting and screwing them into position. When top and bottom connections are made between sections of radiators, each right and left nipple has to be screwed in alternately half a turn at a time to prevent binding or crossing threads, and to remove a section from between others the radiator has to be moved apart a distance equal to at least the length of the nipple. To avoid the use of these right and left nipples in connecting sections of radiators a long bolt through or near one set of joints is used, while close nipples are used in the other joints. It is not, however, generally considered good practice to risk from five to thirty joints on one bolt, especially when the compression which the sections undergo from expansion is taken into account. However, this bolted point has in some instances given good results, but not in all.

these flanges is first ascertained, and the exact length that the pipe has to be cut is approximated in order to allow for the screwing up of the threads of the pipe and flanges. In screwing up the flanges, the holes for the bolts have to be located so as to meet those in the existing flanges. The pipe with flanges is then lifted into place, and the gaskets dropped between the flanges, the bolts are inserted and screwed up. The gasket joint between flanges may be tight, and the threaded joints of pipe to flanges may leak, and if the leak is serious there is only one remedy, which is to break the bolted joint and screw up the flange another turn. To summarize the peculiarities of the present method of joining wrought-iron pipes and fittings, it is only necessary to call attention to a few facts. With the union as well as the flange union, three joints have to be made tight, to obtain one required joint. In the wrought and cast-iron coupling, be it with right, or with right and left threads, two joints have to be secured to obtain one connection; and in the pipe and fitting, no single joint can be tightened up while in position without the loosening of another joint. No pipe between ordinary fittings can be removed without breaking the fitting or cutting the pipe. Thus it is that so much time is wasted in fitting up a pipe system, and an improvement in the construction of joints will aid materially in a still more general adoption of steam and hot-water heating.

#### New Pedestal Tenoner.

Messrs. C. B. Rogers & Co., of Norwich, Conn., and with warerooms at 109 Liberty street, New York, are bringing out a new pedestal tenoner shown in the accompanying engraving. In the design and construction of this machine they have embodied all of the best features of the style of tenoner formerly produced by them, and in addition have introduced new and thoroughly practical ideas. As will be seen in the cut, all of the working parts of the machine are supported on a heavy iron frame, cast in pedestal form, and to which at either side are attached the boxes for the main countershaft. Attached to this column, and cast with it, is an arm with V track that supports one end of the carriage or table, the other end being supported by a smooth-way attached to an extension of the foot or base of the machine. With this arrangement of the way the operator is enabled to follow the carriage right up until the work has passed the cope cutters. The cutters' heads, with straight cutters set for a draw cut, are attached to heavy steel spindles, running in self-oiling connected boxes, to which are also hung the cope-heads, the whole being gibbed to the upright. By an ingenious arrangement the heads are raised and lowered independent of each other, or may be adjusted together to any desired height above the carriage without altering their relative positions. The copes being hung on the same yoke with the tenoning heads, when once set, require no further attention; they are, however, provided with both horizontal and lateral independent adjustment. The pulleys on the cutter-head spindles, as well as the main driving pulley on the counter, are placed between the bearings, and all the other pulleys placed close to the bearings, adding much to the stability and capacity of the machine. The arrangement of this machine is such that every necessary adjustment may be made from the operator's position in front of the carriage.

The frequency of lead poisoning in Newark, N. J., excites much inquiry respecting the cause. One physician suggests that it may be the use of patent stoppers, such as are used in bottles.



PEDESTAL TENONER, BUILT BY C. B. ROGERS & CO., NORWICH, CONN.

fitting. The long screw end of nipple is brought close to end of pipe to which it is to be connected; the coupling is then screwed tightly up on tapered thread on pipe, leaving about half the coupling on long screw of nipple, and the lock-nut is screwed up against coupling, packing being inserted sometimes between the faces of it and the lock-nut. Close nipples are used for another joint. It is a short nipple with all its external surfaces threaded, it having tapered right threads from the center to the outer ends. These nipples are liable to be cut inaccurately on account of the difficulty of holding them. They are used where fittings come close together and in connecting the links or sections of direct radiators having no bases.

There are, besides, right and left threaded nipples of malleable or cast iron, with hexagonal or round centers between the threads, by which the nipples can be turned, and also close right and left threaded nipples with interior flats or projections for an internal wrench. These are used for connecting sections of indirect and direct radiators. Much accuracy is required in their manufacture and the tapping of the holes for them, and much

Another joint in wrought-iron piping is known as the "union," Fig. 7. A union is composed of three pieces and the washer, and when placed complete in position six threads have been cut and tapped, and care must be taken to have the faces of the union square, exactly opposite one another, and close together. Unions are also made with ground joints, and the washer dispensed with. Radiator valves are now generally connected by them, but if the hole in the radiator is not tapped accurately the union when drawn up will not be tight, or if tight the valve will not be straight.

The flange union, Fig. 8, is another joint generally used on wrought-iron pipes above 4 or 5 inches in diameter in making connections to valves, &c., and on smaller pipes in positions where it is a convenient joint. This joint consists of two circular cast-iron flanges with the requisite number of holes for bolts, and central hole tapped tapered to receive thread of pipe. The abutting faces of the flanges are generally turned and the holding bolts fitted into the holes. To fit up a piece of wrought-iron pipe between two flanges already in position, the distance between

### Underground Electric-Light Wires in Europe.

A Milan (Italy) correspondent of *Industries* contributes the following interesting particulars to the subject of underground wires for electric lighting in that city:

Milan was one of the first cities in Europe in which the distribution on a commercial basis of electric light from a central station was attempted. The Milan station has been in continuous operation for nearly five years, and has steadily increased its capacity year by year, maintaining its claim to be the largest electric light station on the Continent. It has passed through various phases of development, supplying at first only incandescent lamps in multiple arc, and then successively adding arc lamps supplied from the incandescent lamp circuits, an independent arc system, and finally the alternate current system. These systems require different types of conductors, with varying degrees of insulation adapted to the different currents and pressures. At first, while the station supplied only incandescent lamps on the Edison two-wire system, the requirements as regards insulation were moderate; but with the application of new systems, operated with pressures of 1500 to 2000 volts, and both direct and alternate currents, new conditions presented themselves, and more particularly in the circuits that were laid underground.

The Milan installation, as at first projected, supplied only Edison lamps from a general underground network, as usually adopted in Edison stations, and in which a constant pressure is maintained by feeders. Edison tubes were at first exclusively used, but on the introduction of the arc lighting system a new type of conductor had to be adopted. The conductors for the supply of the Edison incandescent lamps are all underground, and comprise at present over 13 km. (8.1 miles) of Edison tubes (two-wire system) and 1 km. (0.6 miles) of Siemens cable. For the series arc lighting the Thomson-Houston system is used, only part of the circuits being underground. For this purpose single conductor, lead covered and armored Siemens cables are used, and of this type about 6½ km. (4 miles) have been laid. A Siemens double-conductor concentric cable, having a length of 1.8 km. (1.1 miles), supplies a number of incandescent lamps at some distance from the station, on the Zipernowsky-Deri system. We have thus installed in Milan at present a total length of underground conductors amounting to 22.3 km. (14.2 miles). These several lighting systems are representative of the various conditions of supply which a well-equipped station is called upon to meet, and a few details of the various conductors used, and their electrical properties, may be of interest.

The construction of the Edison tubes is too well known to merit a detailed description. Suffice it to say that in Milan the two-wire system tubes are used with the lamps in simple parallel. In the underground conductor network the tubes are of two classes—mains and feeders. The former have a constant sectional area of 92 sq. mm. (0.14 square inches), and represent a total length of 8 km. (5 miles). The feeders have sectional areas varying from 250 sq. mm. (0.386 square inches) to 650 sq. mm. (1.02 square inches), and lengths varying from 118 m. (387 feet) to 690 m. (2260 feet), representing a total length of 5 km. (3.1 miles) in tube lengths of 6.2 m. (19 feet) each. In the case of feeders, the large number of joints which the use of such short conductor lengths entails is not advantageous and not necessary, as feeders have no derived circuits, and run from the station straight out to the point at which they are attached to the distributing mains. These conductors

carry currents as high as 400 and 500 amperes, with a pressure of 110 volts, and require to be fairly well insulated, as a short circuit of heavy earth in conductors of such a large sectional area might compromise the regularity of the station service. The insulation resistance between the copper segments is usually higher than the insulation to earth, which in the different feeders, after having been in use for five years, varies from a minimum of ½ megohm up to 150 megohms. Cables are to be preferred for feeders, as they may be laid without intermediate joints, or with a relatively small number of such joints, rendering it less difficult to obtain and maintain a higher insulation resistance than in the case where tubes are used as feeders. For one of the feeders a Siemens single conductor lead covered and armored cable is used for each pole of the circuit. The cable has a sectional area of 625 sq. mm. (0.96 square inches), formed of 35 strands of wire, each wire having a diameter of 4.77 mm. (No. 7 B. W. G.). The resistance per kilometer is about 0.0253 ohm.

The cable is provided with a testing wire, which permits of the application in the station of a voltmeter showing the pressure at the feeder terminals, where they are attached to the distributing mains. The stranded core has an insulation of specially prepared hemp, over which follows a lead covering, which is in turn served with a layer of tarred hemp, and the armor consists of two spiral iron bands wound in opposite directions, and served on the outside with a layer of tarred hemp. The external diameter of the cable is about 2.2 inches. The cable has a total length of about 1000 m. made up of lengths of 100 m. each, joined by heavy copper clamps in suitable junction boxes, which are filled with a special insulating compound. The insulation to earth of each pole of the cable has not varied sensibly since it was first laid down some six months ago. This cable has been daily carrying a current of 350 amperes at 110 volts, and the insulation remained constant at about 750 megohms per kilometer of conductor. The cable was delivered in coils of 100 m., which were mounted on a drum supported by an axle spanning the ditch into which the cable was to be laid, high wheels on the sides serving to move along the drum while the cable was being unwound.

The conductors (tubes or cables) are laid in ditches at a depth of 25 to 30 inches below the street level, and the cables are unrolled from the drum right into the ditch. The conductor (tube or cable) having been covered with a layer of earth to 3 or 4 inches, a rough charred and tarred plank is laid over them, to give warning to any future diggers of the proximity of the conductors, and the ditch is then filled up and the paving made good. This simple expedient of laying a board over the cables has saved them from many a pick hole. The Edison tubes were given an extra coat of tar paint before laying in the trenches; but in Milan, which is sadly in need of a complete sewage system, the leakage from the roughly constructed sewage conduits has in many places attacked the iron of the tubes. The streets are built up over the *débris* of the habitations of past generations, and the soil in such localities would in time have ruined the tubes. To effectually preserve the 2000 tubes laid in Milan from becoming corroded to an extent that might in course of time endanger their insulation, it was decided to protect them with a layer of asphalt. The tubes as they lay in the ditch were scraped free from the attached earth, and a tarred wooden box slipped around them, leaving a space of 4 inches between the tubes and the sides of the box. Into this space was poured an asphalt in a semi-liquid state, and consist-

ing of 2 parts of fine sand to 1 part of tar, forming a durable and perfect protection. Some tinned wrought-iron gas pipes that were laid in Milan 35 years ago, and protected with a layer of similar composition, were dug up a short time ago and the tinned iron surface underneath the asphalt was found as bright as when first laid down.

Turning now to the conductors for the Thomson-Houston arc-light system, in which the use of a high pressure requires a more perfect insulation than in the case of the 110-volts circuits, the four dynamos installed in the Milan station have each a capacity of 30 arc lamps connected in series and generate a normal current of 10 amperes. Each dynamo has an independent circuit and two of the dynamos have only their outgoing wires under ground, the return being through an aerial line, while the other two dynamos have both of their circuits under ground, and in this case the under-ground conductors are, therefore, subjected to the full pressure of the dynamos. The under-ground conductors are all lead-covered and armored cables, with a single No. 8 B. W. B. wire. Two types of conductors have been used, one in which the armoring consists of spirally wound iron wires, and a later type in which (as in the case of the previously described larger cable) the armoring consists of two spiral iron bands wound in opposite directions, the outside diameter of the cable being about 1 inch. Although these cables have been in continual use for two years subject to a pressure of 1500 volts, no decrease of their insulation resistance has been observed and no difficulties of any kind have ever been encountered in their use. They were furnished in lengths of 300 m. and had an insulation resistance of about 1200–1500 megohms per kilometer, which, after laying down with joints and connections, became reduced to about 600 megohms per kilometer. At this point it has remained. In especially exposed places the cables are laid into tarred wooden troughs and the space around the cable filled in with cement.

The introduction of the alternate current transformer system called up new requirements, and to meet them we have the double conductor concentric cable. The Zipernowsky-Deri system is used in Milan for the lighting of two theaters that are too far from the station to be economically reached by the network of the Edison system. These theaters are situated respectively at 1200 and 1800 m. from the central station. The concentric cable conveys the 200-volt primary current from the station to the theater, where it is transformed into a 110-volt current supplying Edison incandescent lamps. In general construction and protective armor the concentric cable is similar to those already described, with the exception that it has two conductors placed concentrically. The internal conductor is a single wire of 6 mm. (No. 4 B. W. G.) diameter, and the outer conductor is composed of 44 strands of wire of 0.88 mm. diameter. (No. 20 B. W. G.), with a heavy hemp insulation separating the two circuits. At a point 1000 m. from the station, the cable divides into two branches, one of 200 m. and the other of 600 m., making a total length of 1800 m.

Chamberlain, Wheeler & Co., of Columbus, Ohio, have been appointed sole sale agents for the Sheffield and Birmingham Coal, Iron and Railway Company's plant at Sheffield, Ala., which has just been completed. Within a few weeks the three furnaces will be in blast. The estimated aggregate capacity will be 420 gross tons daily. The company will use brown hematite ores exclusively, a fact which gives promise of a high quality of product.



### The Sheet-Iron Manufacturers' Meeting.

A special meeting of the Sheet Iron and Sheet Steel Manufacturers' Association was held in Pittsburgh on Wednesday, the 11th inst. N. E. Whittaker, of Wheeling, W. Va., was chairman, and W. C. Crone-myer, of Pittsburgh, acted as secretary. About 15 firms were represented. The object of the meeting was to discuss the proposed reduction in the tariff on sheet iron and sheet steel. It was decided to send Mr. John Jarrett to Washington to protest against the bill at the meeting of the Senate Committee on Finance, which took up the bill on Thursday, the 12th inst. A member of the association made the following statement after the close of the meeting as to the action taken and the present condition of the trade: "The low price of sheet iron at present is directly due to the low tariff on the English product. The Mills bill will reduce it even lower, until we are driven out of the business altogether. For the past year or two people in the East could import English sheet steel and get it cheaper than they could from Pittsburgh. The present tariff schedule does not cover sheets of soft steel, and the consumers, taking advantage of the present laws, import soft sheet iron, on which they pay but an ad valorem duty. This places the Pittsburgh manufacturer at a disadvantage in favor of the Englishman."

"It was at first proposed to reduce wages to make up the deficiency until the tariff laws could be amended, but as we see the men will not accept a reduction we must do something to save ourselves. A number of manufacturers, instead of making their own sheets, find it more profitable to import those of English make. The difference between the wages paid in this country and England for the same work is from \$6 to \$8 per ton."

### Joseph Wharton on Nickel.

The following letter from Mr. Joseph Wharton, the only producer of nickel in the United States, is published in *Lock and Bell*, of New York:

You call my attention to Mr. E. P. Wheeler's remarks concerning my nickel business, and to the Meriden Britannia Company's reply, as published in your paper, and you ask for my comments. I know nothing about this Mr. Wheeler or his affairs. He is obviously no less ignorant about me and my affairs. Mr. Wheeler assumes that I have grown rich by reason of a bounty paid to me in the guise of an import duty on foreign nickel, virtually a tax, as free traders delight to call such an import duty, drawn from my helpless fellow-citizens by the Government for my benefit. He grieves that the Meriden Company were so oppressed by this tax as to be forced to build a factory in Canada, and he thinks that "if Congress had passed a law making him (me) Duke of Lancaster, and giving him (me) a pension of \$20,000 a year," it would have done, except in name, just what it has done. Mr. Wheeler's untruth about the Meriden Company having been demolished by that company I turn to his other points. Is it then true that I am an incubus on my countrymen, idly sucking their subsistence by means of a vicious tax for my pampered sustenance? No! It is not true. It is a lie. In the year 1862, after having established in this country the manufacture of spelter or metallic zinc, I was informed that the United States Mint was unable to procure nickel for making one-cent coins, since the American attempts to produce that metal had broken down, and in no foreign country could an adequate supply be purchased. Inquiry

at the Mint confirmed this: the coinage of cents was really suspended for that cause.

I purchased the remains of the disused nickel works in Camden, N. J., and the Gap nickel mine in Lancaster County, Pa., which was then idle and full of water. These I put in order and wrestled for seven years with the inherent and the artificial difficulties of the business, at the end of that time having what was probably the completest nickel establishment in the world, though it has as yet yielded but little profit. In that interval my factory in Camden had been burned down and rebuilt, with great improvements; the Government had abandoned coining nickel alloy cents, but had afterward adopted, first a 3-cent coin and later a 5-cent coin of a richer nickel alloy; the foreigners who, before I started, could not satisfy either our mint or our private bureaus, had been my fierce competitors for the custom of both; the price of nickel had averaged about 4s. 6d. per pound in England, and about \$1.25 per pound here; the import duty, which was 10 per cent. in 1863, had increased in 1866 to 15 per cent., the latter being about one-third the average rate of duty on all other dutiable imported goods. The pampering of the wicked nickel-maker had not yet begun. In 1870 the duty on nickel was raised to 30 cents per pound, in 1872 it was reduced to 27 cents and in 1874 it was restored to 30 cents—about one-half the rate of duty on other metals. The business now yielded a moderate profit, the customers were well satisfied and my wickedness was not yet apparent, except to some disappointed foreigners.

In 1873 the German Government decided to adopt nickel alloy for certain of its coins, and thereby created a demand for nickel which absolutely stopped all shipments to this country from Europe and carried large quantities of my nickel to Europe. The price there ran up to the unprecedented figure of 16 shillings per pound for a time, equal to nearly \$4 per pound, and for several years averaged about 12 shillings or \$3 per pound. American nickel buyers had absolutely no resource but my works, but I kept them fully supplied at prices as low as those of Europe, not including import duty, and was kindly informed by one of my old English competitors that I sold needlessly low. My profits during those years were, of course, large, but it is hard to see how Mr. Wheeler could have prevented them. Then came a great decline, caused by the cessation of German coinage and by large shipments of rich nickel ores from the lately opened mines of New Caledonia. Year after year the price fell, and one after another the nickel mines and works of Europe succumbed to the constant pressure of the lower and lower prices established by the great nickel monopolist of the world, the French company, Le Nickel, which owns the great mines of New Caledonia. The price in Europe is now about 2 shillings a pound, and here about 60 cents a pound. No nickel mine and only two or three nickel works in Europe have survived the attacks of Le Nickel. In this country I am alone and Mr. Wheeler will kill me if he can have his way.

A marked feature of the early years of this incessant fall was the urgency with which the foreigners shoved their nickel into this country, and the amiable willingness of Secretary Folger to connive at their cheating the customs. The duty on nickel being 30 cents per pound, and that on alloy of nickel with copper (meaning a half-and-half alloy which had been in vogue) being 20 cents per pound, foreign nickel makers experimented on the complaisance of our Government by increasing the proportion of nickel in such alloy until they

had raised it to 95 per cent. (as high as commercially pure nickel when the law was made), and all this was for years admitted by Mr. Folger at the low rate of 20 cents per pound. Surely Mr. Wheeler should find some consolation in this happy device of his friends. Next, after some years of depression, came the Tariff Commission of 1882. Congress then, not following the recommendation of that commission, but acting upon it with an intelligence akin to that of Mr. Wheeler, set upon pure refined nickel the duty of 15 cents per pound, and upon a pound of nickel in matte or in ore the same duty of 15 cents per pound, and so the law now stands.

This charming arrangement, which shuts out all nickel material, while admitting refined nickel, the most difficult of metals to produce, at an inadequate rate equaling about 30 per cent. ad valorem, is mad enough, one would think, to satisfy any free trader who is not unusually dyspeptic. Yet it is against this that Mr. Wheeler pipes his little complaint. Under it more than two-thirds of the nickel used here is imported, and my works pay no profit, not even any interest or rent on capital or plant. The effect of my persistence in running the works which Mr. Wheeler would like to close is that foreigners sell their nickel here at less than their home price plus our duty, hoping to break down my works and then recoup by higher prices. Here is no wicked pampering of a lazy monopolist, and I submit that the free trader who demands yet more for his foreign friends is almost too good a Mugwump to live in this sad world. I have refused to notice the variegated nonsense that has from time to time appeared in print about my nickel business, but it is perhaps my duty to put a stop to it. It is men of my kind, and not of Mr. Wheeler's kind, who make this country something for its citizens to be proud of, and for the people of other countries to respect.

**New Guns.**—Some recent firings at Sandy Hook with the army 12-inch breech-loading steel mortar for long range tests have given highly satisfactory results. With a charge of 80 pounds of powder and a 630 pounds shell a range of 6 miles and 135 yards was obtained. The two 8-inch breech-loading steel guns built by the West Point Foundry for the Chicago have been completed and shipped to the proving grounds at Annapolis for test. The 10-inch steel breech-loading rifled gun designed for the iron-clad Miantonomoh, and the first steel gun of this caliber completed by the navy, has been finally adjusted upon its hydraulic carriage at the Annapolis Proving Grounds, and fired to test the working of the carriage and breech mechanism. These worked easily and accurately, and the gun is now in a condition to carry on experiments for determining the proper grade of powder with which to conduct the statutory tests.

In 1878 the six great French railway companies were working between them 11,700 miles of line. At the close of 1887 the corresponding total had risen to 18,045 miles. This latter total was made up as follows: Paris, Lyons and Mediterranean, 4970 miles; Orleans, 3703 miles; Western of France, 2805 miles; Eastern of France, 2718 miles; Northern of France, 2157 miles, and Southern of France 1692 miles.

The Lowell Machine Company, of Lowell, Mass., were incorporated in 1845, and their capital stock is \$900,000. They employ 1400 men; their weekly pay-roll amounts to \$11,000; the territory covered by their shops and boarding houses embraces nearly 13 acres, and they have the capacity to turn out the machinery for a mill of 40,000 spindles in three months.

### A Trip to Lebanon, Pa.

Last Thursday a small party gathered at Philadelphia in a special car to visit two manufacturing establishments in the Lebanon Valley, with the chief object of affording Messrs. Watson and Mueller, engineers of Mr. Claus Spreckles, the sugar king of the Pacific Coast, an opportunity to satisfy themselves that one of the concerns possesses the facilities to carry out contracts since entered into for supplying the ironwork for the great sugar refinery now being built in Philadelphia. Besides the gentlemen named the party consisted of Frank Dundore and James Meily, of F. Dundore & Co., Philadelphia; L. M. Moyes, of the Babcock & Wilcox Company; Adam B. Rork, who has the contract for part of the work of building the refinery, and Charles Deacon, a well-known Philadelphia journalist, the representative of *The Iron Age* being the eighth member of the party. Early on Friday Conewago Junction, on the Pennsylvania Railroad, was reached, the special car being taken to Lebanon over the Cornwall and Lebanon Railroad, one of the most thoroughly built and equipped lines in the country. Comfortably sheltered in the Lebanon station of the road, a little gem architecturally, the party partook of a substantial morning meal after having made a preliminary reconnaissance of the works of

#### THE LEBANON MFG. COMPANY,

a concern which has developed from modest beginnings nearly a generation ago to a well-equipped plant, employing between 300 and 400 men, having a capital now of about \$237,000. For years the company have made a specialty of steam engines, blowing engines, furnace ironwork, general machinery, and of late years have added the building of cars to their lines. Among the contracts lately filled were six blowing engines for furnaces at Sheffield, Ala., built by Gordon, Strobel & Laureau, the last of the six having been shipped about two weeks since. The foundry, a brick building of 60 x 195 feet, contains one 54-inch Colliat cupola, and one 40-inch ordinary cupola, two spacious core ovens, the whole floor space being commanded by a 20-ton Niles overhead traveling crane of the latest design. The machine-shop, 60 x 198 feet, besides a large variety of smaller tools, contains a 6 x 7, 28-foot Putnam planer, a Niles boring mill, 14-foot swing and 10 feet high, a 96-inch Niles locomotive wheel lathe, and a 58-inch Niles radial drill. The smith shop is 50 x 125 feet, and there are, besides, car works with the necessary wood-working machinery, a setting up shop, paint shop, storehouses, &c. The officers of the company are A. Reinohl, president; R. Meily, vice-president; J. M. Gettel, superintendent, and J. Hunsicker, treasurer, the agents being Frank Dundore & Co., of Philadelphia. It is in this establishment that the cast-iron work for the Spreckles' refinery is to be made, the contract for the first block of 2300 tons, including beams, &c., having been awarded to Dundore & Co. It is estimated that the entire structure, will call for 13,000 to 14,000 tons of cast and wrought iron, the capacity of the refinery aimed at being 1000 tons of sugar per day.

Taking the car over the tracks of the Lebanon and Tremont Railroad, the party was carried past the old town of Jones-town, once a busy place on the long-abandoned Union Canal, to Lickdale, where the works of

#### THE LICKDALE IRON COMPANY

were inspected. On the site of an old forge, parts of which are still standing, this company have built a Clapp-Griffiths plant, after the well-known design of Mr.

James P. Witherow, of Pittsburgh. It consists of two 3-ton converters, one of which was blowing at the time of the visit, the most interesting feature in connection with the operation being the copious flow of cinder from the cinder notch during the blow, and the fact that mountain limestone is used to make the bottom. The mixture used, in connection with which there are some interesting points, appears to make a hot blow, and allow of considerable additions of scrap. The works have a Lewis two-high blooming train, driven by a Tod Porter-Hamilton engine, and served by a Smith gas heating furnace. The location, however, does not appear to be favorable, situated as it is on an unimportant branch road. Last year the company made a round lot of higher carbon steel for rail blooms, but the conviction has been reached that the proper sphere for the plant lies in mild steel, and attention is now being given particularly to slabs and billets for rails, plates, sheets and structural shapes. Col. J. N. Lick, a relative of the famous James Lick of Pacific-Coast fame, is president and C. P. Sherk is superintendent, Frank Dundore & Co. being selling agents.

Returning to Lebanon a visit was paid by a few of the party to the Weimer Machine Works, too hasty, however, to do justice to the magnitude of its operations or the many interesting special points noted. In the erecting shop was a very large blowing engine, just being completed for the Warwick Iron Company, and a smaller blowing engine, one of a dozen, built or building, for the Ensley plant of the Tennessee Coal, Iron and Railroad Company.

Returning to the special car, the latter was found to be decorated with flags and devices expressive of the sentiment "Protection to American Industries," which met with expressions of approval from the men employed at the mills and furnaces passed during the rest of the journey. After a very brief visit to the Colebrook furnaces, probably the most lavishly equipped plant in the United States, the party was carried to the famous Cornwall ore banks. Drawn up over the great spiral track to near the summit of the big hill the party ascended to the top to find spread below the fertile Lebanon Valley, with 11 furnaces, all in active operation, within sight, all of them drawing their supplies from the wonderful deposit lying at their feet. During the last six months these furnaces clustered around Lebanon made 119,000 gross tons of pig iron.

Magnificent though the mineral properties of this country may be, none thus far discovered outside of the exhausted Comstock lode approaches in past record or in present or prospective value that of the Cornwall ore banks. The Calumet and Hecla, with its great record of dividends, the Ontario, of Utah, the best paying silver mine in the Rocky Mountains, the Homestake, the great gold mine of the Black Hills, Dakota, the Vermillion mines, of Minnesota, the Colby, of the Gogebic range, and the famous properties of the Marquette and Menominee regions, the enormous magnetite deposits of Lake Champlain, and the far-famed Iron Mountain, of Missouri, are all eclipsed by this Pennsylvania accumulation of iron ore. It has been repeatedly described in detail, the most elaborate, scientific and historical monograph on it having been published a few years since by D'Invilliers, of the Second Geographical Survey of Pennsylvania. Yet few outside of a comparatively narrow circle realize how enormous must be the revenue drawn from it, and what are the vast possibilities for the future.

The cost of putting the ore on cars is 20 cents a ton. As it carries considerable sulphur it must be roasted, which is usually estimated to cost 40 cents

a ton, the kilns being at the furnaces. Adding as a liberal figure 15 cents a ton for transportation to the furnaces in the immediate vicinity of Lebanon, a total cost is reached of 75 cents a ton, roasted, at the furnace. The ore, however, is sold to the furnaces, the majority of which are controlled by parties holding an interest in the ore banks, on a sliding scale based on the monthly average price realized for No. 3 pig iron. In the case of the latter, an important part of it is again based on the price of rails at the consumer's mill. Taking the ore at cost and coke at \$3.50 per gross ton, the cost of production of pig iron must be under \$10 a ton, while the selling price even now averages probably slightly above \$14. Of course the furnace companies as such do not earn such profits, but it is probably within the bounds of the truth when we state that the owners of the ore banks realize fully \$2 a ton, if not more, on every ton quarried. In 1887 the output was 667,210 gross tons, and in 1886 it reached 688,054 gross tons. When it is considered that generations will not exhaust the deposit at the present rate of extraction, some idea may be obtained of the royal income derived from the property by its possessors.

The concern is divided into 96 shares, of which Robert Coleman owns over 30, the balance being cut up into comparatively small holdings. Conversing on one of the latter a gentleman who is very familiar with the property was asked what he believed two shares would fetch if thrown on the market. After some hesitation, and prefacing it with the remark that it depended largely upon the condition of the trade and other circumstances, he expressed the opinion that it would probably not be a difficult matter to get \$500,000 for one forty-eighth interest in the property. The possession of a claim upon the profits realized certainly seems to create some indifference to values if there is any foundation in an anecdote related. One of the fortunate owners of a few shares in the Cornwall mills has a residence in one of the leading cities of the United States. Adjoining it there is a large hotel, whose proprietor, encouraged by success, believed that it would be a good investment to purchase the adjoining property for the sake of enlarging his facilities for entertaining guests. A suggestion on his part that the owner of the residence name his price was met with the startling answer: "What will you sell your hotel for? I have long been thinking of enlarging my lawn."

The view into the charming valley of Lebanon was a fitting climax to the trip to one of the most favored sections of the country, the home voyage being promptly begun.

Among the retail hardware concerns at present doing business at Quincy, Ill., is that of the Cottrell Hardware Company, located at No. 124 North Fifth street. The company occupy the entire structure, which is five stories in height, and carry in stock a full assortment of general hardware, tin plate, agricultural implements, vapor stoves, woodenware, &c. The first floor of the building is devoted to the retail department, in the rear of which is the shipping department, which in turn adjoins the counting-room. One of the rules of this house is that all orders shall be shipped by the evening trains on the day they are received, something that is generally appreciated by the customers. The second floor of the building is occupied by the sample room. The third and fourth floors and the basement are devoted to the storage of goods. The company keep four salesmen on the road, who visit their friends in the trade once every month.



## THE WEEK.

The New York and New Haven Railroad Company have completed arrangements for connection and a traffic agreement with the Poughkeepsie Bridge Company, and has signed a contract for 50 years. This will give the Delaware and Hudson, and the Erie direct connection for coal traffic with the New England States, and will also let the West Shore Railroad in for a short route direct to points east.

The Mexican Pacific Railroad about to be commenced will extend from Mazatlan to the Colorado River in Southwestern Arizona and will be one of the most important lines of railroad in Mexico, making a continuous line of 1400 miles. It is stated that when the concession was first secured it was the intention to obtain the aid of English capital in building the road, but when the promoters arrived in New York, they found an abundance of American capital at their disposal, and the road will be built and owned entirely by Americans.

Chief Engineer Church in his testimony before the Senate Investigating Committee last week to some extent approved of certain departures from the specifications which were made by the aqueduct contractors in the execution of their work. He said that practically the aqueduct is a tunnel all the way through, for the cuts were so deep that when filled in they were "practically tunnels," justified the use of the rubble masonry in place of dry filling. He had a sad example before him in the dilapidated old aqueduct. The question of dry filling or rubble masonry was not of much importance in a railroad tunnel, but of the greatest importance in an aqueduct, which was to last, not alone, for 20, 50 or 100 years, but for all time. In case of a break it would be impossible to carry on extensive repairs, and in a short time the city would be left without water. At any point a difference of 18 inches would upset the balance of pressure. The question had to be decided by the chief engineer alone, because he only had the data all along the line. When his assistants gave their views before the committee, no matter how well equipped they might be as engineers, they could not speak authoritatively on the matter in dispute because they had not all the data in their possession. Two years ago he himself had not that data.

English encroachments in Spanish America are the theme of a correspondent in Merida, Yucatan. The principal lines of railway are passing into her possession, and other schemes are in contemplation with a view to obtaining control, so it is alleged, of the entire transportation interests of that country. And now, says the writer, the Mexican Government has contracted with an English firm for the completion of that long-talked-of Tehuantepec Railroad, which when completed will furnish a shorter cut across the continent than either the Nicaraguan or Panama schemes. The road in question at various times has been a pet project with several parties in the United States, the last of whom, Edward Larned, of Pittsfield, Mass., made considerable progress in the work of construction. It now remains to be seen what the English corporations will accomplish. The line—whose entire length is about 200 miles, two-thirds of which is partially completed—runs from the bay to Coatzacoalcas, on the Gulf of Mexico, due south, to Salina Cruz, on the Pacific Ocean, traversing the southern portion of the States of Vera Cruz and Oaxaca. The Rio Coatzacoalcas is navigable for about 30 miles, and at low tide the depth of water on its bar is 13 feet. The immediate section produces cotton, sugar-cane, to-

bacco corn, coffee, cocoa, vanilla, sarsaparilla, ginger, indigo and india-rubber. Salina Cruz, the Pacific terminus, is said to have an exceptionally fine harbor. The English contractors (Col. Edward MacMardo, represented in London by Lord Archibald Gosford) are to receive \$10,000,000 in 5 per cent. bonds, secured by a first mortgage on the entire property.

The trestle bridge near Orange Court House, Va., broke down under the weight of a passenger train, and eight persons were instantly killed. Many others were wounded. The trestle was 48 feet high, and known to be weak.

Corean progress is uninterrupted, no political disturbances having occurred. The Legation at Washington city will soon be fully re-established and consulates be opened in New York and Philadelphia, American gentlemen filling the positions. The Corean telegraph and cable line has been completed to Japan by way of Fusan, and active steps are being taken looking toward the developing of the rich natural resources of the country. Advice is also received to the effect that Judge O. N. Denny, ex-United States Consul General to China, has been reappointed Governmental Adviser for a further period of two years.

An electric street railway, the first of its kind in Massachusetts, was opened for business last week, at Crescent Beach. The line is  $1\frac{1}{4}$  miles in length, a branch of the Lynn and Boston railway. Like the electric road at Ansonia, Conn., the electric current is taken from a wire running above the track, the return current being conveyed through the rails of the track, which are connected by wire for that purpose.

Secretary Whitney and Secretary Endicott have each asked Congress for the appointment of an Assistant Secretary, on the ground that the efficiency of their respective departments will be greatly increased thereby. Construction to the extent of scores of millions of dollars is going on or is in contemplation for the purpose of replacing the old fleet by a new one. This work will probably last through the remainder of the century at least. Coupled with it is necessity for providing heavy guns for the new vessels. Respecting the war office in addition to the ordinary considerations, it must be remembered that it is now proposed to enter upon a most important system of coast and harbor defense, which may require the expenditure, first and last, of more than \$100,000,000 for forts, guns and auxiliary means of protection. This will necessarily impose new labors upon the War Department.

The new theater building on the site of Irving Hall will be absolutely fire-proof, with a domed roof richly ornamented with ironwork, and the interior will be fitted with an iron drop curtain.

The latest shipment of "canned goods" from this city to San Francisco comprises 16 tin cases containing the bones of dead Chinamen being returned for burial.

Work on the Croton Aqueduct thus far is said to have cost \$19,000,000, or more than double the estimates, and it is intimated that for this reason and the close relations between the commissioners and the contractors a reconstruction of the commission is probable.

There is a marked decrease in the number of buildings for which plans have been filed this year in New York City. The records at the Bureau of Inspection of Buildings show that the cost of the buildings in these plans for the quarter ending with March was \$9,460,491, and for the quarter ending with June was \$15,897,204, making a total for the six months of \$25,357,695. This is a remarkable decrease from

former years. The total for the first quarter in 1886 was \$17,088,643, and for the same period in 1887 it was \$17,254,865.

Chicago is promised a prosperous year in the building trades. The report of the local building department shows that up to July 1, 1888, the number of permits issued was 2156; value of buildings constructed, \$11,131,000, an increase of \$1,423,828 compared with 1887.

An important new departure in the use of natural gas is announced in Pittsburgh. The Philadelphia company are preparing to put in meters. The fuel has been used extravagantly, simply because it does not cost the consumer any more than the fixed annual rate. Some of the meters for the iron and steel mills will have a regulating capacity of 1,500,000 cubic feet.

Consul-General Raine, in a report to the State Department, says that Professor Serling, a distinguished German authority, in a work recently published, reviews with much care the condition of agriculture in the United States, and comes to the conclusion that, notwithstanding contrary arguments and the greater difficulties at present encountered in America (and he criticises severely our land policy and the acquirement of great tracts of land by capitalists and railroad companies), American competition, after all, must be looked upon as controlling the grain market of the world. The professor states that it is true that the competition of America, as far as Germany is concerned, has become more and more significant.

A Berlin correspondent of the Indianapolis *News* says that meat in that city is 100 per cent. dearer than it is here. He continues: "Although, as a rule, wages here are very low, taken from an American standpoint, living is really higher than in America, especially so in Berlin. Rents are very high, and people live very much crowded, and if it were not for the very strict enforcement of sanitary laws it would necessarily be one of the most unhealthy cities in Europe, while it is in reality the opposite. Bricklayers are trying hard, by virtue of unions, to maintain a price of 12½ cents per hour. Cabinet-makers and upholsterers average 10 cents per hour. Tailors and shoemakers about the same. Servant girls, who, by virtue of laws governing their particular branch, are almost entirely at the mercy of their mistresses, earn on an average about \$38 per annum. Other occupations in like proportion, from the day laborer to the bank cashier. The only redeeming feature in this unnatural state of affairs is that clothing, shoes and amusements are cheaper than in America."

Hiram Sibley, of Rochester, a native of North Adams, Mass., died July 12, aged 81 years. He early manifested a taste for mechanical pursuits, and has left several permanent memorials of his active life, among others Sibley College of Mechanics and Arts of Cornell University and Sibley Hall, attached to Rochester University. He was the first president of the Western Union Telegraph Company, which office he held 16 years. He was a large promoter of business enterprise.

The Jerome Park site being required by the Aqueduct Commissioners, extensive buildings for the Jockey Club will probably be erected in Westchester at a point equally distant from the city. The plans prepared by Thos. R. Jackson, the architect, contemplate an expenditure of \$300,000, the buildings to be entirely of iron, brick and stone.

The Bureau of Steam Boiler Inspection in New York reports that inspectors had examined 1622 steam boilers carrying over 10 pounds pressure, during the second quarter of the year, had tested 1365 and found 101 defective; 26 boilers were con-

demned as unfit for further use. There were 1629 applicants who were examined for engineers' certificates: 1492 stood the test and 137 were rejected. No accidents or explosions occurred during the quarter, a rare occurrence in this city.

An electric system, by which the movement of railway trains while at full speed is automatically regulated, has been introduced successfully on the West Shore line. Briefly told, the system consists in an apparatus adjusted to the rails on either side of the track, and is composed of two springs, which, as they are pressed down by the weight of a passing train, cause a red "banner" in the guise of a semaphore to be exhibited, and this signal stands at "danger" until every wheel has passed out of the block which it entered. At the same time the apparatus registers in the train-dispatcher's office the number of wheels that have gone in and out of the block. The failing of a single wheel to emerge from the block is thus at once signaled, as would happen in the case of a train parting in twain. It is claimed that at the Weehawken tunnel the cost of working this apparatus is but \$75, as against \$3000, the cost of the system formerly in use.

Several years ago a number of German workmen went to Connecticut by a preconcerted arrangement and obtained employment in the clock factories in New Haven, Ansonia, Waterbury, Thomaston and Winsted. They worked steadily for a long time, applied themselves diligently to mastering the science of clock-making and became proficient in the art of handling fine tools. They also purchased tools and several of the complicated machines, and, returning to Germany, they began the manufacture of clocks for themselves. They set up a factory in the Black Forest region, and their business now amounts, according to letters recently received, to nearly 50,000 clocks a month. This German factory has proved a close competitor with the Connecticut concerns in the foreign markets.

The vast stride made by New York City during the past century can be seen by comparing the contents of the first volume of the City Directory with those of the one for 1888-89, just issued. The volume of 1786 contained the names of 846 residents, and that of 1888 contains the names of 335,228 residents. In the former year the population of the city was 23,614, whereas to-day it is estimated that the resident population is fully 1,676,140. The floating population is calculated at 400,000, and a close observer reckons that on each day of the year there are about 2,000,000 persons within the limits of Manhattan Island.

The President having signed the bill creating a Department of Labor, the act has gone into operation. The Commissioner of Labor will now report directly to the President and not to the Secretary of the Interior. No increase in the number of employees is made, and Carroll D. Wright continues to be commissioner.

The President has approved the bill providing for the appointment of commissioners to represent the United States at an international maritime conference, which is to devise ways and means better to secure life and property at sea. The President has accepted the resignation of the Hon. George V. N. Lathrop, United States Minister to Russia, to take effect August 1. Mr. Lathrop is not in good health.

The stupendous plan for supplying the city of Liverpool with water involves the removal of a whole Welsh village, including woods, cottages, churches, &c., this immense space to be devoted to a reservoir  $4\frac{1}{2}$  miles long by  $\frac{1}{2}$  mile to 1 mile broad

and 80 feet deep. There are to be three lines of pipe, each 68 miles long, with filtering beds and secondary reservoirs, and the cost of the aqueduct alone is estimated at \$15,000,000.

The United States Grand Jury at Springfield, Ill., have indicted the St. Louis, Alton and Terre Haute Railroad Company (Canso Short Line) for violating the postal laws by carrying irregular mails and letters for the Consolidated Coal Company.

The Congressional bill passed by the House for the erection of an appraiser's warehouse in New York City increased the amount of appropriation from \$1,500,000 to \$3,000,000.

Sunset Cox, speaking of the next decennial census, estimates the population of 1890 at near 64,000,000.

Two bids were received at the Navy Department for machine finishing and constructing steel breech-loading rifles for the cruisers Baltimore and Charleston. They were from the West Point Foundry Company and South Boston Iron Works, and were exactly the same—that is, \$3800 for one and \$40,800 for 12.

Whitelaw Reid's newly furnished mansion, erected by Ben Halliday, and lately known as part of John Roach's estate or Ophir Farm, was burned on Saturday, as supposed in consequence of a defective flue. Loss \$500,000.

Report says Commander Folger, U. S. N., will have charge of the new Washington ordnance foundry, and that he will make a tour of all the large ordnance works in Europe before entering upon the local duties of the office. He will be associated with a civilian expert.

The stock of pig iron in Connal & Co.'s Glasgow stores at the beginning of July exceeded 1,000,000 tons, an amount never before reached or considered possible. Not a few in the trade are disposed to look on the accumulation as a wholesome indication, operating as a sort of governor by relieving the market of a surplus at one time and checking speculation at another.

A boudoir on the roof of the Equitable Building, 200 feet above the ground, for the occupancy of President Hyde, will be reached by a flight of gilded iron stairs, and be inclosed in a gilded network of iron, the whole superbly furnished.

The membership of the Knights of Labor, according to statements purporting to come from official headquarters, has dwindled from 729,000 in July, 1886, to 348,672 at the present time.

Icelanders to the number of several thousand are flocking into Manitoba, refugees from intolerable winters and consequent poverty and starvation.

The election of Dr. Juan Pablo to the presidential chair in Venezuela is construed as an omen favorable to closer relations with the United States.

Miss Garrett, the daughter of the Baltimore millionaire, practically directs the management of a property valued at \$20,000,000, and for many years before the death of John W. Garrett was regarded as a sagacious adviser.

The New York State Attorney-General, it is reported, will be invoked to annul the charter of the United States Illuminating Company, who are in opposition to the Board of Electrical Control. According to one statement, supposed to emanate from the telegraph companies, a "deal" was made, whereby the present conduit, which consists of iron pipes, was to be foisted upon the city in the guise of a system properly constructed for receiving the wires. The Subway Company for some reason prevailed upon the commission to

adopt this pipe system, although the commission had decided upon an asphalt concrete system because its engineers had previously reported that asphalt would be less objectionable than iron, and therefore doomed to failure. The charge is made that the Metropolitan Telephone Company have sought to create a monopoly of all electrical service in this city through the means indicated.

The Canadian Pacific Railroad is gradually establishing itself among the recognized great channels of traffic, and is not only overcoming obstacles that arise, but taking a position among Northern railroads, where it may assume an aggressive attitude. The latest achievement is to secure by purchase a controlling interest in the Duluth, South Shore and Atlantic Railroad, thereby obtaining possession of an American and Canadian systems of no less than 6500 miles. The road is expected to take a larger share of local business from Lake Michigan ports. Still another advance step is the building of the Sault Ste. Marie and Southwestern road, for which, according to a Montreal dispatch, funds have been secured. It is intended to construct the link between the Union Pacific and the Canadian Pacific railways, giving the former, by a traffic combination now being arranged, a line eastward to tidewater from the Missouri River 250 miles shorter than any now operated, and giving the Canadian Pacific entrance into territory southwest of its present system in Manitoba and Ontario.

Cleveland papers bring accounts of an alleged mammoth syndicate, well supplied with English capital, who propose to build a fleet of ore steamers and monopolize the trade of the Lakes in that department of enterprise, but the scheme does not appear to have a substantial foundation.

Consul Cabro, representing the Argentine Republic in New York, speaks of the rapid increase of the carrying trade between the two countries. The Republic, he says, look to the United States for almost everything that is wanted. All kinds of machinery and agricultural implements come from this country, being cheaper and of a superior quality, but in the absence of direct steam communication it was found necessary to contract for shipments via Liverpool and London.

Claus Spreckles is reported from San Francisco to have scored a point with the sugar trust in his first onset by buying 50,000 tons of raw sugar, cornering the market, and realizing \$40 per ton or \$2,000,000 profit from the transaction.

The Manhattan Athletic Club intend to erect an elegant club house on Madison avenue and Forty-fifth street, to cost \$300,000 exclusive of the land. It will be 125 feet square.

The Senate proposes to add \$800,000 to the post office appropriation bill for the encouragement of American steamship transportation, but the House is strongly opposed. Foreign lines volunteer to perform the service for less money, but a nursery of American seamen is desirable, as a provision against future trouble.

At the annual meeting of the Rome Merchant Iron Mill, Rome, N. Y., the officers elected for the ensuing year were Jim Stevens, president, Wm. Stevens, vice-president, Chas. W. Lee, secretary and treasurer, Samuel Southall, superintendent, and Jay Hildrith, agent. The company have steadily enlarged their works during the past year, having lately built three additional double puddling furnaces, which, with other improvements, have materially added to their capacity. They are running full in all departments and are well supplied with orders.



## MANUFACTURING.

### Iron and Steel.

The Pittsburgh Forge and Iron Company, of Pittsburgh, whose works are located in Allegheny City, are attempting to run the forge department of their mill with non-union men. Some time ago the firm proposed a reduction of 10 per cent. to all employees not members of the Amalgamated Association. The men refused to accept the reduction and the works were closed down. It is stated that more than half the old employees are at work, having accepted the reduction. The resumption of work does not affect the Amalgamated Association. Nothing will be done about their scale for the present. James K. Verner, secretary of the company, has made the following statement as to their future intentions: "We have started the forge and mean to run it. We will run it at the reduction or not at all. We will not sign the Amalgamated scale. After we get things in first-class working order with the other we will turn our attention to them."

The nail factory of the Wheeling Iron and Nail Company, at Wheeling, W. Va., has been closed down for an indefinite period. The blast furnace of this company was also blown out on the 1st inst. for the purpose of being relined and repaired. It has made an excellent record, having been in blast continuously since November, 1885, on one lining. It will resume operations again about October next.

The Laughlin Nail Company, of Wheeling, W. Va., whose extensive works are located at Martin's Ferry, Ohio, are endeavoring to complete their usual summer repairs with the view of resuming operations at the earliest moment possible. This company are enjoying an unusually brisk trade this year, and are disposing of their product as fast as it is made. Their factory contains 192 nail machines, and for the past six months their output was over 180,000 kegs, while their shipments for the same period amounted to 190,000 kegs.

Furnace No. 1 of the Stewart Iron Company, Limited, at Sharon, Pa., was blown out Tuesday, the 10th inst., owing to the unsatisfactory condition of the iron market. The company have a very large stock of pig iron on hand with very little demand for it. The furnace will remain idle until there is a decided improvement in the business situation.

The Ensign Mfg. Company, Huntingdon, W. Va., have received an order from the Baltimore and Ohio Railroad Company for a large number of car wheels for their road, to be delivered in installments of 2000 per month.

The Cartersville Iron Furnace Company, of Cartersville, Ga., have been chartered by John Postell, D. W. R. Peacock, Geo. A. Patillo and others, with a capital of \$25,000.

The Eliza Iron Company, of Wellston, Ohio, operating the Eliza furnace under lease, will put the furnace out of blast in the course of two or three months and will retire from business, on account of the depression in the iron trade. The company state that the cost of manufacture of pig iron at present is over and above the price obtained for it, which is the reason for the above step. Wellston Furnace, also located at Wellston and operated under lease by King, Gilbert & Warner, of Columbus, Ohio, was blown out on Saturday, the 7th inst., for an indefinite period. Milton Furnace, owned and operated by the Milton Furnace and Coal Company, at Wellston, will also be blown out at an

early date. The above-named furnaces, three in number, comprise all the blast furnaces located at Wellston, and in a short time they will all be idle.

The Peerless Mfg. Company, of Louisville, Ky., have issued a catalogue consisting of some 25 plates, presenting a great variety of artistic iron linings and portable basket grates. The designs are very handsome, and give evidence of great care in their execution.

The plant of the National Tube Works Company, at McKeesport, Pa., resumed operations on Thursday the 12th inst., after an idleness of about ten days for repairs.

The Granite Iron Rolling Mills of the St. Louis Stamping Company are undergoing repairs, which will be completed in about three weeks. No exchange of views with employees of the mills looking to a resumption of operations under any scale of wages has been had.

The creditors of Graff, Bennett & Co., of Pittsburgh, have made application to Court for the sale of the three iron mills of the firm. The Court ordered the sale of all the property on 20 days' notice. The mill properties of Graff, Bennett & Co., are among the most valuable in Pittsburgh. One is located on the South Side, and the other at Bennett Station, on the West Penn. Railroad. They also owned the Clinton furnace in Pittsburgh, and were interested in the Grafton furnace at Leetonia, Ohio.

The St. Louis Sheet Steel and Iron Post Company, of St. Louis, have filed articles of incorporation, with a capital stock of \$500,000.

Lean & Blair, engineers and contractors, of Pittsburgh, have received a contract from the Union Rolling Mill Company, of Cleveland, Ohio, for the erection of five large heating furnaces and a gas-producing plant complete. These works have heretofore run on coal, but will change to gas.

As reported in our last week's edition, the Laclede Rolling Mills will be closed down for an indefinite period in the early part of this month, the present operators, the Laclede Plate and Sheet Mill Company, not caring to renew their lease, which has already expired.—*Age of Steel.*

At the Philadelphia Bridge Works of Cofrode & Saylor, at Pottstown, Pa., new hours of labor went into effect on Monday the 9th inst., to continue until further notice. Instead of working from 7 until 12 and 1 to 6, the hours will be from 6 to 12 and to 6 five days of the week, and on Saturday commence at 6 and quit at 11 a.m. for the remainder of the day.

The Bethlehem Iron Company have made a proposition to the men that if they are willing to share with the company a reduction in prices which would be covered by a reduction varying from 5 to 20 per cent. in wages in the different departments, the company on their part hope to be able to provide reasonably steady work during the balance of the year. This applies to the steel mill and old rail mill, but not to the puddle mill. The men have accepted the proposition and the works have resumed operations.

### Machinery.

Mr. C. E. Torrance has purchased the interest of Messrs. Pattee & Draper in the Holyoke Hydrant and Iron Company, Holyoke, Mass., and will continue the business as heretofore under the name of Holyoke Hydrant and Iron Works, C. E. Torrance, proprietor.

Mr. J. D. Thomas, representing the Westinghouse Machine Company of Pittsburgh, has departed for Rome, Italy. The

object of his visit there is to introduce the Westinghouse system of electric lighting. Some time ago six dynamos, manufactured by that company, were sent to Rome and Turin. These machines will be put in operation by Mr. Thomas, and an electric-lighting plant erected in both the cities named.

The Oil Well Supply Company, Limited, of Oil City, Pa., have just received from the East a large drop hammer, which is believed to be the largest in this country. With this hammer and several of smaller capacity, the company are now prepared to do heavy drop-forged work, and at present are at work on an order from New York parties for drop forgings for a patent car-coupler.

A dispatch from Youngstown, Ohio, under date of the 8th inst., reads as follows: "Work will be commenced to-morrow on the new shops of the New York, Pennsylvania and Ohio Railroad at Brier Hill. The contract for their construction has been awarded to Drake, Shattuc & Co., of Pittsburgh, who also have the contract for the double-tracking of the road from here to Cleveland. The company have bought 36 acres for the shops, and expect to have them ready to be occupied by November 1."

The new twin-screw propeller, Monmouth, from Philadelphia, was entirely successful on her trial trip to Sandy Hook. She is 931 tons burden, with four boilers and improved engines. She cost \$250,000, and it is expected that she will develop a speed of 16 knots an hour. One special feature in the construction of the boat is the adoption of the twin-screw propeller. Her length over all is 270 feet, her width 48 feet and depth 15 feet. The cylinders are 19, 30, and 50 inch diameter by 30 inch stroke of piston, and are expected to develop 2500 indicated horse-power, with a steam pressure of 160 pounds. Piston slide valves on all the cylinders are worked by the Marshall valve gear, the air pumps are driven off side levers and the centrifugal circulating pumps driven by independent engines.

The Howe Scale Works, at Rutland, Vt., were sold at auction the 12th inst., for \$441,283. The sum includes the amount of liabilities, \$201,133, which are assumed by the purchasers. The new owners will take possession within 60 days. Work will go on without interruption.

The Laidlaw & Dunn Company, Cincinnati, Ohio, have been awarded the contract to furnish all the necessary pipes, fittings, valves, heaters, pumps, &c., for the large new works of the Addyston Pipe and Steel Company, now being in course of erection at Addyston, Ohio.

A newly formed company, with ample capital, have purchased Dr. Raub's patent for his central power engine, the first of which was constructed at the Grant Works some two years since, and which, it is claimed, has proven a very great success. It is said that ten of the engines will be built at the Grant Works as soon as the new company are ready to begin operations.—*Paterson (N. J.) Daily Guardian.*

The Curtis Regulator Company, of Boston, Mass., report increasing foreign sales, among which, within the last few weeks, are two damper regulators in England and in Denmark. They have sold, also, 18 steam traps and six pressure regulators; also damper regulator of 200 horse-power for the Congaree Mfg. Company, Columbia, S. C.; a 4-inch steam separator in New York and one 6-inch and an 8-inch steam separator to the Tremont Nail Company, of Boston.

### Hardware.

The Columbiana Handle Company, Columbiana, Ohio, who bought out the Leetonia

Tool Company, the first of the year, have built a new shop, 121 feet long and 40 feet wide, which they are now occupying. The works are situated on the main line of the P. F. W. and C. R. R. They report a good trade, domestic and foreign.

The Cincinnati Wire Company, Cincinnati, Ohio, whose factory, as we have already noticed, has been idle for a short time, in order to take inventory and make alterations, have resumed operations and will run it to its full capacity for the balance of the year.

The St. Louis Vise and Tool Company, of St. Louis, have increased their capital stock from \$5300 to \$30,000. Its assets are reported to be \$47,661.78, and liabilities \$15,781.64.

The Freeman Barb Wire Company, of East St. Louis, who employ about 125 men, cut wages about 20 per cent, on the 13th inst., and the result was a strike, and 100 men left the shops. The wages ranged from \$2 to \$3 per day, and there was a cut of 50 cents all around. The company expect to fill the strikers' places.

The Belleville Nail Company, of Belleville, Ill., have notified the Secretary of State of Illinois of an increase in their capital of \$100,000 to \$300,000.

#### Miscellaneous.

The Pittsburgh Natural Gas Company, of Pittsburgh, have been incorporated, and have already begun work on their line from the gas field at Murrysburg to Pittsburgh. The new company start with a capital stock of \$350,000, and the stock is all held by members of the firms of Park Brothers & Co., Limited, of the Black Diamond Steel Works, Pittsburgh, and William Clark's Son & Co., also of that city. The company own a considerable block of gas territory in the Murrysburg district, and as the two firms mentioned compose the firm they will henceforth furnish their own fuel. The contract for the laying of the pipe has been let to Gwinner & Co., and the work is now in progress. The line will be 19 miles in length. The first 7 miles will be of 12-inch, and the remaining 12 miles of 16-inch pipe. The contract for the 12-inch pipe has been let to Dennis Long & Co., of Louisville, Ky., and the 16-inch pipe is being made by the National Tube Works, at McKeesport. The work will be completed before autumn. It is estimated that the cost to the two firms for fuel under this plan will not be more than one-half what it is at the present time.

It is announced that the Westmoreland Coal Company, of Irwin, Pa., will build a new car shop at that place that will give employment to about 100 men. The firm will build their own cars, which are now made in the East.

Portsmouth, N. H., claims to have the largest shoe manufactory in the world, paying out to their employees \$35,000 every month. They have also an extensive machine shop, employing a large number of skilled mechanics.

The following corporations have been authorized to transact business in Illinois: The F. C. Austin Mfg. Company, of Chicago; capital, \$150,000; for the manufacture of all kinds of road-building, well-building, mill and farm machinery; incorporators, Frederick C. Austin, Elbert H. Cary and Thomas C. Chapman. The Universal Mfg. Company, Chicago; capital, \$12,000; to manufacture heaters and burners of petroleum for cooking purposes; incorporators, J. Howland Silvera, Arnold Brecher, Henry D. Duff and Sumner Stowe Ely. The Goodrich Mfg. Company, of Chicago; capital, \$20,000; to manufacture sewing machine attachments; incorporators, Charles W. Rhodds, Almon W. Bulkley and Edward E. Gray. The Lake Shore

Foundry Company, of Chicago; capital, \$15,000; to conduct a general foundry business; incorporators, P. H. Meehan, R. D. Wardwell and Oscar Ludwig.

The engine house at the Florence iron ore mine, at Florence, Wis., was totally destroyed by fire on the 13th inst. The engine house contained about \$75,000 worth of machinery, including five engines and hoisting drums, four boilers, two compressors, two pumps, &c. The building was valued at \$1500. The building and machinery were insured for \$14,000, which, it is believed, will cover the loss, as the boilers and pump and three of the engines and drums are not thought to be seriously damaged. Temporary boilers have been procured so as to keep the mine free from water. An air compressor will be working in a few days, when hoisting will be resumed.

#### The Lockout Nearing An End.

Judging by the rapidity with which the Amalgamated scale is being signed by the Western iron manufacturers, it is safe to assert that the close of the present month will find a majority of the mills in operation at the terms proposed by the Amalgamated Association, and the lockout practically ended. While the prediction may seem strange in view of the apparent firm stand taken by the members of the Western Iron Association at their recent conference meetings, it is nevertheless true. Although the month is little more than half gone, more than 25 firms have already signed the scale and their works are in operation. It is not to be expected that the balance of the manufacturers who have thus far refused to sign the scale will be content to allow their mills to remain idle while their trade is being taken by competitors who have resumed. While it is true that some of the manufacturers may hold out for some time yet, it will be because their repairs are not completed, as they could not operate their mills at present if they wished to do so. The admission must be made that the Amalgamated Association have scored another victory at the expense of the manufacturers.

The manner in which the lockout has ended has already caused considerable ill-feeling between some of the manufacturers and the early disruption of the Western Iron Association is hinted at as the result. While we do not believe that this will take place, there is no denying the fact that there is dissatisfaction and that it may result in the withdrawal of a number of firms. The announcement is made that at the next meeting of the association Chairman A. F. Keating will resign his position and that the firm of Zug & Co., Limited, of which he is a member, will withdraw from the organization. Their course will no doubt be followed by others. The dissatisfaction is said to be particularly strong among the manufacturers of the Shenango and Mahoning valleys and the severing of the connection of a number of firms from these sections will no doubt take place. The claim is made that the manufacturers in the above-named places have for years stood with the Pittsburgh manufacturers and engaged in strikes on the promise that the latter were strongly united, and, with the assistance of the outside manufacturers, the Amalgamated Association, could be defeated. When the real test came, however, the Pittsburgh manufacturers were the first to give in and sign the scale. In the future they propose to act independent of the Western Iron Association and will not be governed by it in any way.

Another report has been vigorously circulated to the effect that if the scale is not satisfactorily arranged next year at the conference meetings each member of the Western Iron Association, should it be

in existence, will be required to put up the sum of \$20,000 to bind any compact that may be made. An effort will also be made to include the steel manufacturers in this, as the fact of so many steel firms signing the scale as soon as presented has a tendency to weaken the iron manufacturers and cause them to agree to the terms presented in order to protect their interests. The report further states that this \$20,000 will be forfeited by any firm who signs the scale without being authorized to do so. The truth of this report has been earnestly denied by several manufacturers, and we do not attach much value to it, for the reason that the manufacturers would hardly be laying out a plan of campaign for another lockout until the present one is definitely settled. It is a well-known fact, however, that the manufacturers went into this conflict without being sufficiently united to stand a long suspension of work, and it does not seem strange, therefore, that they have been defeated. A large number had positively refused to state whether they would sign the scale or remain idle, while others said that if certain firms signed that they would also be compelled to do so, in order that they could protect their interests. The following named firms have signed the scale in the order given, in addition to those noted in our last issue:

Jones & Laughlins, Limited, Pittsburgh, Pa.  
Central Iron and Steel Company, Brazil, Ind.  
Brown & Co., Pittsburgh, Pa.  
Long & Co., Pittsburgh, Pa.  
Licking Rolling Mill Company, Covington, Ky.  
Ohio Falls Iron Works, New Albany, Ind.  
National Tube Works Company, McKeesport, Pa.  
Jennings, Beale & Co., Limited, Leechburg, Pa.  
New Philadelphia Iron and Steel Company, New Philadelphia, Ohio.  
North Chicago Rolling Mill Company, Chicago, Ill.  
Falcon Iron and Nail Works, Niles, Ohio.

The Commercial Club, of Louisville, Ky., which, as a means of developing various industries, has never had an equal in that State, has aroused enthusiasm enough among the merchants and manufacturers to inaugurate a new movement to advertise the city's business and advantages. A committee have been appointed with plenty of money to draw from, and will act with a well-known expert to arrange for a "Fall Celebration," which will be on the plan of the Mardi Gras of New Orleans, only it will last many more days and be more varied. The yearly expositions are among the things of the past, and, as something is needed to keep the city abreast of her neighbors and attract strangers, it is decided to institute the celebration with a view to make it a regular occurrence. The exact limit and scope have not yet been developed, but it will be on a grand scale.

The Sessions Foundry Company, of Bristol, Conn., are about the largest strictly jobbing foundry in New England. Their line is especially small or benchwork castings, although they make large quantities of other work. During their business year, which ended May 1 last, the amount of their freight received and shipped was upward of 12,000 tons, which furnishes an idea of the magnitude of their business. They make a specialty of a fine quality of iron and smooth, well-molded castings.

The rail mill of the Western Steel Company, at St. Louis, closed down on the 12th inst.



# The Iron Age

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It is a curious fact, and a deeply interesting one at this time, that the selling price of steel rails at English works is not more than the mere cost of the labor employed in the production of steel rails in the United States. This has been demonstrated by the figures of one of the leading rail mills of this country. Their entire product for 1887 was considered in the calculation, which embraced all the materials used, beginning with the mining of coal, ore and limestone. The labor employed in the production of minor articles in the shape of mine, furnace and mill supplies was not included, as it would have to be estimated, but the labor entering into the preparation of the leading materials and their manipulation was a matter of almost exact computation. The difference in the cost of manufacturing steel rails in this country and abroad is strikingly shown in the above statement, as the selling price of English rails necessarily includes profits on the preparation and manipulation of the various materials. The only true way to get at the cost of labor entering into the production of an article is to follow it up from its crudest form. In the case of a steel rail the labor does not begin at the pig, the steel ingot or the bloom, but it begins at the mine.

## The Copper Situation.

The English newspapers, echoed by a number of our own daily press, are earnestly endeavoring to create the impression that the famous French syndicate is on its last legs. They marshal an array of figures, formidable enough, it is true, to cause some alarm, and affect to believe that it points to an early collapse of the gigantic speculation. It may be confessed that if they keep at it long enough they must ultimately be in a position to point with pride to the verification of their predictions. We doubt whether there are many fair-minded people familiar with the copper trade who would not be willing to go on record as prophets of a fearful break in copper at some indefinite future period. With the exception of a few mine owners who are reaping a golden harvest, the trade in the United States is bitterly opposed to the manipulators of the metal, because they are causing some restriction of consumption and because ultimately a very severe and prolonged depression must follow. They know that the consumer is paying a heavy tribute to foreign speculators.

However unpopular the operations of Secrétan and his backers may be it would be unwise to assume that the clique is losing its grip now and that they are on the verge of a panic. Their control of the situation is too powerful as yet. Their contracts with mining companies embrace the following tonnage, our table giving the prod-

uct of 1887, the output of 1888, as estimated by one of the leading authorities in the world:

	Merton's product 1887. Gross tons.	Estimated prod- uct 1888. Gross tons.	Syndicate con- tracts 1888. Gross tons.
Algiers.....	150	150	....
Argentine Re- public.....	170	170	....
Australia.....	7,700	10,000	4,000 Cobar, Moonta
Bolivia.....	1,300	2,000	....
Austria.....	700	1,000	....
Canada.....	1,400	2,000	....
Chili.....	29,150	35,000	3,000 (Panulcillo)
Cape of Good Hope:			(Cape Cop- per Co.)
Cape.....	5,950	5,950	5,950
Namaqua.....	1,300	1,500	1,500 (Namaqua)
England.....	1,500	2,000	....
Germany:			
Mansfeld.....	13,025	14,000	....
Others.....	1,850	2,000	....
Hungary.....	500	500	....
Italy.....	2,500	3,000	3,000
Japan.....	11,000	12,000	9,500
Mexico:			
Boleo.....	1,950	3,050	3,050 (Boleo)
Others.....	100	500	....
Newfoundland	1,180	2,000	1,200 (Betta Cove)
Norway.....	1,450	2,500	2,000 (Vignaes)
Peru.....	50	250	....
Russia.....	5,000	5,000	....
Sweden.....	500	1,000	....
Spain and Portugal...}	54,056	60,000	40,500 { Rio Tinto, Tharsis, 11,000 Mason, 7,000 (all leading producers)
United States:			
Lake.....	33,330	40,000	40,000
Montana.....	35,225	50,000	45,000
Arizona.....	8,035	10,000	8,500
Others.....	2,519	5,000	....
Venezuela.....	2,900	5,000	5,000 (Quebrada)
Total.....	224,490	275,570	178,000

So far as is known all but the Japan and the Anaconda contracts are for three years, those named being for one year only. To this may be added practically the whole of the Chili product outside of the Panulcillo, say 32,000 tons. Though this copper is not contracted for, it is bought in Chili or from importers in England at the time of shipment or on arrival in England. It is estimated that the syndicate now holds over 45,000 tons, in addition to about 20,000 tons of English copper. A review of the status of affairs so far as the remaining quantities are concerned shows the following: The product of Austria, Hungary, Germany and Russia, in all estimated at 22,500 tons for 1888 is taken care of by local consumption. This leaves an estimate of 38,090 tons of outside floating copper from all sources, which the syndicate must either take care of ultimately in some shape or other or which cuts out so much metal from the trade of the companies controlled by it. That it is doing so is proven by the statement made in the last circular of Messrs. James Lewis & Sons, of Liverpool, who state that little of the Rio Tinto, Tharsis and Cape copper produced at the smelting works of those companies during the first six months of 1888 has been sold, the stock thus accumulated being the 20,000 tons of English copper already referred to.

That the speculators are carrying an enormous burden is certain. All the producing countries of the world are industriously pushing supplies to the European markets. For the first six months of 1888 the imports of copper into England, France and Italy, exclusive of pyrites and precipitate to English outports were 64,896 tons fine, against 40,049 in 1887, and 50,925 tons for the first six months of 1886. Of this the United States is credited with 8690 tons in 1886, 7220 tons in 1887, and 19,209 tons in 1888. By far the

greater part of it, not less than 16,303 tons fine, has come from one mine, the Anaconda, of Butte City, Mon.

While supplies have thus materially increased and deliveries have fallen off, it must not be forgotten that the statistics of visible supply are to some extent misleading. During the eight months since the famous upward rush of copper, stocks of raw materials and of manufactured goods in all manufacturing countries have been run very low. The whole world was scoured for old copper and old brass of every imaginable form, and that substitute for new metal is now pretty nearly exhausted, too. Therefore, while production is increasing, consumption of new metal, too, must prove heavier, though it must be far below the accumulating supplies.

One important consideration is evidently forgotten by those who are talking of an early collapse of the metal. While the syndicate has reserved special powers of ordering a reduction of output in only a few of its American contracts, it may be readily conceived that it might succeed in bulldozing other contracting mines into lessening production. A threat to involve them in the general loss which would follow the failure of the Société des Métaux and the syndicate might make them willing to aid it by some sacrifices of output. It is believed by good authority that when the break should come, £30 for Chili bars would not be an unusual figure for some time. Rather than see such a calamity come about the large companies might be willing to strengthen the hands of the speculators by agreeing to restrict production. So far that contingency has not yet arrived, but it is likely to precede any serious decline.

## Domestic Motors.

Within the past six or seven years development in the line of what may with some reason be termed domestic motors has been unusually rapid, and in addition to several of the older and already well-known engines of this type a large number of new forms have been brought into extensive use. We need perhaps scarcely explain that under the head of domestic motors may be embraced those engines which are mainly designed with the view of being intrusted to unskilled management, and which accordingly dispense with the use of an independent power generator, such as a steam boiler. It is interesting to note, however, that the demand for such engines has not been limited to those who cannot provide for attendants with any engineering qualifications worth speaking of, but has extended to a large number of power users who have found that such motors efficiently meet their requirements. The application of small engines of special make to such home services as pumping water and running ventilating fans and sewing machines is familiar, and has apparently had the effect of demonstrating that even larger powers, required for the heavier work of operating printing presses, small machine shops, electric light installations, &c., can be satisfactorily obtained without resorting to steam engines or to water-wheels which require a special location and usually expensive accessories.

At the present time the gas engine is undoubtedly performing the largest share

of the work done by the whole class of domestic motors, so-called, and, in many instances, has shown itself to be a formidable rival of the steam engine, successfully driving machinery for which only a few years ago it was considered not at all well adapted. In capacity the engine has experienced a steady increase, the originally small sizes of fractional horse-power, and of one, two and five horse-power, though still turned out in large numbers, having been followed by 10, 20, and, quite recently, even by 50 horse-power engines—ample evidence of the growing popularity and fitness of the motor for comparatively heavy duty. From the single-cylinder engine it was but an easy transition to a design calling for two cylinders, and this again prompted the building of four-cylinder engines, some of which, of the Otto type, have been turned out abroad, the aim being, we understand, to secure greater regularity of working and higher economy in point of gas consumption. We do not know whether these designs accomplished all that was expected of them, but, in any event, the increased cost of maintenance and the complication of parts which they naturally entailed, detracted, in some measure, from their claim of belonging to a class of engines which required no skilled attendant and which were not subject to frequent derangement. Simplicity of construction is a very important matter—in fact, it is of the first importance in any engine which is to suffer the abuse of untrained handling, and, despite some of its shortcomings, the single-cylinder gas engine will, therefore, in all probability, remain in favor for some time. This seems to be borne out, moreover, by the fact that nearly all the recent designs are of this type, a circumstance of which the weight will be all the more appreciated when it is considered that such designs have been brought out in large number, foreign engineers having been particularly active in this respect.

Closely allied to the gas engines are the various forms of petroleum motors, which have been given prominence of late. In these a mixture of air and petroleum in the form of vapor or spray is introduced into the cylinder and fired. Where a supply of gas is not available, these engines offer special advantages, and would seem to be assured of a favorable reception; and it is but natural therefore that both in this country and abroad their introduction is being vigorously prosecuted.

Hot-air engines are now so well known that we need scarcely more than mention them here. Their principal use hitherto has been confined to pumping water in buildings, for which purpose they are peculiarly well adapted and extensively manufactured, one works alone in New York turning out about 600 per annum. While it is questionable whether for the present they will be employed to any very great extent for general low power purposes, it is interesting to note that they are built by several engineering firms with this end in view, and are also employed in the English and in the United States lighthouse services for compressing air for operating fog-horns. Their simplicity and convenience are generally recognized, but these good features are in a measure overshadowed by the fact that, compared with other motors of equal power, they are large and cumbersome pieces of machinery.

In the line of water motors there has been no lack of progress, and small power users now have the choice of a large number, all of them being claimed to be efficient and generally satisfactory. In some localities where a comparatively high water pressure is maintained in the city supply pipes, these motors have been used to the exclusion of many small engines of other types designed for similar work, and, to all appearances, with very good results, their entirely harmless character, ease of management and cleanliness tending largely to make them popular.

One of the later arrivals in the field of small engines for household and other uses is the electric motor, of which the wide range of usefulness is at once apparent. Its application to driving elevators and ventilating fans has secured for it a fair proportion of public favor, and has more recently been followed by its adaptation to pumping and other work of a general character. For obvious reasons, however, its use is at present limited to special localities. Before leaving the subject we cannot but refer to the several forms of small steam engines which are now on the market, and which, while embracing steam generators, have been designed specially with the view of being managed by unskilled attendants. The boilers are heated by kerosene, and the whole outfit is perfectly automatic in its working, the regulation of the fires, steam-pressure, water-level, &c., being entirely independent of the attendant. The element of danger from carelessness or ignorance is thus practically eliminated, and the engines are not without just claims to a place in the class of motors which we have considered.

A shipment of 600 tons of Lake Superior charcoal pig iron was made to England last week by the Elk Rapids Iron Company, of Michigan. The sale was negotiated by F. H. Head, of Chicago, vice-president of the company, who has conducted similar transactions in years past, although this is considerably the largest. Mr. Head states that such shipments are only possible in times like the present, when the price of charcoal pig iron is very low. Swedish charcoal pig iron is used to a limited extent in England in the manufacture of some grades of steel and of malleable castings. Its price does not fluctuate so much as the price of pig iron in this country, consequently high prices here cut off all chances of trade in that direction, while a return to low prices here renews the opportunity to compete. The price to be met is about \$22 per ton at Liverpool. The freight rate secured on the Elk Rapids iron from the furnace to Liverpool is understood to be \$4 per ton. It is carried wholly by water, going to New York by lake and canal. At New York it will be transferred to a steamship of the Inman line. It will be seen that the price netted is the ruling rate for Lake Superior charcoal pig iron at furnace. Part of the iron will go to Derby, England, and part to other points of consumption in that country. Our readers generally do not need to be informed that this shipment of pig iron from America to England is of a special character, and that it does not mean a serious invasion of the English home market. Probably one Michigan blast furnace would be able to keep England supplied

with all the charcoal pig iron required, as its use is quite limited. It would seem to be needed for malleable iron castings to a great extent, but they are not so widely used in England as in this country, owing to the cheapness of forgings answering the same purposes.

### The Railroads Projected in Porto Rico.

Since American enterprise undertook railroad building in Mexico some ten years since, and endowed that country with a system now exceeding 6000 km., other nations begin to take in hand similar undertakings in countries South of us, in which nothing of the kind had been attempted, although it was more than probable that they would prove as remunerative there, perhaps even more so. Strange to say, the lesser Spanish Antille, Porto Rico, although the most populous Spanish colony, has so far been overlooked, and has been without a mile of railway. Now, however, a railroad is to be built without delay to run along the entire coast. The engineering obstacles to be overcome will be slight, comparatively speaking, nor will there be much difficulty in procuring workmen at moderate wages on the spot. A great impulse will be given to the development of agricultural and pastoral interests in the island by the railroads planned, a matter of no small interest to American trade, our export of domestic products increasing in that direction at a rapid pace. The planting interest centers upon the three chief products, sugar, coffee and tobacco. Sugar is cultivated along the entire coast, and the quality is very fair; coffee is grown in the mountain districts, also of a most desirable quality, while the tobacco culture occupies small farmers on the plateau, and produces a merchantable leaf of medium quality. Sugar has been so low that at times planters have found it difficult to make the two ends meet, but some of them partially resort to rum distilling, thereby improving their income, a few distilling even bay rum. Coffee has paid the planters well during the last two years, and in some shape or another the population manages to flourish more than elsewhere in the West Indies, which accounts for their taking American goods more freely.

There is no difficulty about labor; the 90,000 freedmen all work at moderate wages, and so do the white working classes. While the island has only an area of 9314 sq. km., the population numbers 900,000, having increased as follows:

1834.....	258,886	1867.....	731,648
1846.....	443,139	1883.....	810,394
1860.....	583,308	1887.....	900,000

The population of the cities is as follows: Ponce, 37,545; San German, 30,146; Mayagüez, 26,446; Arecibo, 25,754, and St. Johns (the capital, a fortified place), 23,414. The concession to build the 546 km. of railway, 468 of which to run along the coast, was granted at Madrid by adjudication on March 5 last for 99 years in the round sum of 49,640,000 pesetas or francs and comprises the ensuing localities and distances from St. Johns to Mayagüez via Arecibo and Aquadilla on the northern coast 185 km.; from Mayagüez to Ponce via San German, 90 km.; from Rio-Piedras to Humacas via Fajardo, 96 km.; from Ponce



to Humacas via Arroyo, 125 km., and from Caguas to Humacas via Juncos, 50 km. The last four lines connect the western coast with the eastern through the southern and partially through the interior. The Spanish Government guarantees 8 per cent. interest per annum on the sum of money named. The Porto Rico Railroad Company were formed at Madrid on May 17, 1888, and on June 8 the Government confirmed the concession as vested in the company named, thus incorporating the same. The share capital of the company is 16,000,000 pesetas or francs, and a contract was made with the Porto Rico Railroad Company to commence building at once the 275 km. from St. Johns to Ponce via Mayagüez, that being the most important line. The construction company have a share capital of 2,500,000 pesetas.

There being 95 inhabitants to the square kilometer in Porto Rico, prospects of a large traffic are most encouraging, since in France there are only 72 inhabitants per square kilometer; in Portugal, 48; in Spain, 32; in Cuba, 13, and St. Domingo, 11.

The island being comparatively small there are only 833 km. of telegraphs in operation, with 35 offices, of which 14 are Government and 21 are municipal, the island being divided into 71 municipal districts. The Porto Rico sugar crop was large last year, when 81,355 tons were exported. The United States received 131,443,632 pounds of it. In 1886 only 59,333 tons were shipped, and in 1885 the shipments reached 88,959 tons. In the latter year there were also shipped 21,669 tons of coffee, 30,645 tons of molasses and 3495 tons of tobacco. Cattle exportation to other W. I. islands is also considerable. The import into the island in 1885 was \$11,745,022, against \$13,132,293 in 1884; the export was \$14,048,639, against \$11,618,883. There entered in 1885 1648 vessels of a joint tonnage of 108,896, and sailed 1544 with 147,125. American trade increased as follows:

Calendar year.	Import from Porto Rico.	Domestic export.
1887.....	\$4,515,684	\$1,868,079
1886.....	4,093,245	1,579,148

The budget for 1887-88 estimates the income of the island at \$3,550,372 and the outlay at \$3,551,841.

An agreement has been arrived at between the United States and Spain, prolonging the existing commercial arrangement having reference to the Spanish colonies, pending the conclusion of a more ample treaty. The agreement may be terminated on two months' notice being given by either side.

The evidence thus far brought out concerning the alleged dynamite conspiracy among discharged employees of the C., B. & Q. Railroad Company, members of the Brotherhood of Locomotive Engineers, is exceedingly damaging to that body, unless it can be proved that they have no complicity in the plot. It is essential to their reputation as law-abiding citizens that the circular signed "S. E. Hoge, chairman of the General Grievance Committee," calling for men "to disable engines in every way they can," &c., shall be proven to be a forgery. Thus far five engineers are under arrest and General Manager Stone of the railroad company tells a startling

story respecting the character and extent of the plot with which they are declared to be prominently identified. The best course for the Brotherhood is to repudiate all connection with this alleged diabolical business, and as evidence of their good faith lose no time in "calling off" a strike that only serves to foster the worst passions of men, besides affording a standing example of insubordination and lawlessness for which there is no possible justification. As the case stands it looks very black for Chairman Hoge and his friends, and his overtures for a compromise coupled with the menace of a general strike should the railroad company continue its "persecution" (prosecutions), can hardly relieve the strain of the situation. In truth, should not any form of bulldozing be indignantly spurned? The Brotherhood, at least as individuals, entirely repudiate all connection with the infamous plot now plainly revealed, and beyond any question are prepared to sustain the laws, in common with the community at large, as against any form of anarchic devices.

#### All-Rail Shipments of Lake Superior Ores.

Attention having frequently been drawn to the probable transfer of a considerable proportion of the iron ore tonnage of the Northwest from lake vessels to all-rail routes, we have collected information on the subject from the railroad lines interested. The result of these inquiries is somewhat disappointing to those who believed that a very considerable share of this trade had been diverted from its old channel. We find that the entire all-rail shipments of Lake Superior ores to Milwaukee and points south of that city amounted to but 75,349 gross tons between December 1, 1887, and May 1, 1888, against 99,385 tons between December 1, 1886, and May 1, 1887. These figures show not only the limited extent of the all-rail movement of Lake Superior ores, but also a decrease in the past season as compared with the previous one. This, however, should not be taken to indicate the course of trade in the future, special reasons existing for the decrease, which will be noted hereafter.

The railroad companies over whose lines the ore was hauled embrace the Chicago and Northwestern and the Milwaukee and Northern, from the Menominee and Marquette districts, the Chicago, Burlington and Quincy with the Chicago, Burlington and Northern, from the Vermillion district, and the Milwaukee, Lake Shore and Western and the Wisconsin Central, from the Gogebic district. The bulk of the tonnage was hauled from the Gogebic mines—namely, 96,936 tons in 1887, and 67,391 tons in 1888. The Vermillion mines made no all-rail shipments in 1887, this movement with them beginning in 1888.

With these figures before us, and a knowledge of the condition of the iron trade, it is easy to account for the falling off in all-rail shipments in the past season. In 1886-87 the demand for iron ore was very heavy, owing to the prosperous condition of almost every branch of the iron business. The Gogebic mining district was also in the full enjoyment of its boom, and mine owners were pushing the work of developing new deposits, in order to

help the sales of mining shares. During the past season, however, the iron trade was dull and depressed, and for a considerable part of the winter the output of the iron and steel works of Chicago and vicinity was greatly restricted, so that much less ore was consumed. The collapse of the Gogebic speculation also stopped shipments from all but the sound and properly worked mines. This change in the condition of affairs came very suddenly after the all-rail movement had been inaugurated. If it had been delayed for two or three years the results would have probably been more in harmony with the expectations of the believers in the ultimate absorption of the ore-carrying trade by the railroads. The first points the railroad companies had to demonstrate were cheapness of service in comparison with vessels and the assurance of reliable winter deliveries when vessels were unable to run. Both have been very satisfactorily demonstrated by this time, and the foundations are, therefore, laid for the future. Although vessel rates are much lower this summer than they were last year, ore shipments are now being made by rail and will continue the whole year round.

This significance of this change in the methods of transportation is of greater importance than simply a transfer from one set of freighters to another. It means the manufacture of pig iron in the Northwest under more favorable conditions than have heretofore existed. Under the old system a sufficient quantity of ore had to be stored at the furnace in summer to last until navigation reopened. This required a heavy outlay of capital and also prevented a furnaceman from taking advantage of sudden changes in the condition of trade. A heavy stock of ore would compel him to run until it was smelted, even though prices ruled below cost, while, if he had decided not to lay in a stock in summer, he was unable to take advantage of a favorable turn in the market during the winter, because of the impossibility of securing ore. Freed from the necessity of carrying a large stock, a furnaceman is also able to buy ore to greater advantage from competing mine owners when trade is depressed. For these reasons and others the iron and steel manufacturers of the Northwest take a lively interest in the development of the all-rail movement.

The United States Commissioners to the Paris Exhibition are Gen. Wm. B. Franklin and Somerville Pinkney Tuck, who have just received their credentials from the President, and are now in this city engaged in the preliminary work of preparing documents for distribution, having opened an office at 35 Wall street. They already predict a good representation of objects from America. The space allotted is about 7000 square yards. The freight charges out and return are defrayed by the Government, from the Congressional appropriation of \$250,000 in aid of the exhibition. The commissioners are also allowed the free use of the mails. The exhibition opens May 5, and closes October 31.

It is reported that Mr. H. F. DeBarleben, of Birmingham, Ala., is agitating the idea of arranging for storage of Southern furnaces as the basis of issues of warrants. The scheme has been laid before capitalists, but that feature of it which aims at making the yards adjoining the furnaces themselves the storage points does not appear to meet with approval.

## CORRESPONDENCE.

## Terms of Payment on Pig Iron.

Since the publication of our last issue we have received a number of letters on this subject, some of which we give below. We repeat the questions which called them out:

1. Does four months' time on pig iron mean from date of shipment or date of receipt of the iron?
2. If cash discount is taken, is it taken from the date of the furnace shipment or from the date of the receipt of the metal?

CINCINNATI, July 10, 1888.

*To the Editor:* In reply to your circular letter of July 5, our understanding is that four months' time is from date of receipt, if iron is sold, as is usual, f.o.b. cars at the city of the purchaser; or, if, as is sometimes done, the iron is sold f.o.b. furnace, it refers to date of shipment. The former, however, is the general practice. If cash discount is taken it is taken from date of receipt of the metal.

THOS. A. MACK.

LOUISVILLE, KY., July 10, 1888.

*To the Editor:* The time for dating a note on a four months' contract for pig iron depends upon the conditions of the sale. If the iron is purchased on cars at the furnace, then the notes should be dated from the date of shipment. On the other hand, if the purchase is made delivered at some distant point, the note should be dated from the time of the arrival of the iron. Custom, however, has fixed it differently—that is, settlements are usually made on the first of the month following the delivery. The conditions of a cash discount are in main covered by the above. It should be taken from date of the furnace shipment if purchase is made at the furnace, or, if made for delivery at another place, then it should be taken from the time the iron arrives at point of destination. Yours truly,

HALL BROS. &amp; Co.

LOUISVILLE, KY., July 9, 1888.

*To the Editor:* There is no custom in this market that regulates the time from which four months' paper for pig iron is dated. As far as possible the seller endeavors to obtain his paper from the date of shipment, but as the buyer generally makes the paper it is oftener dated from time of receipt (or even a short time after that) than it is from the time of shipment, and sellers generally accept notes as received, unless the time taken is too long to be admissible. If parties pay cash instead of giving notes, where they have privilege of four months, they generally take discount for four months and remit up to the time they would otherwise give their notes, unless these cash settlements are unusually delayed, in which case the deduction is generally made for the unexpired time. The trade suffers from these irregularities which creep in during times of great anxiety to sell and producers submit to concessions asked for by buyers. In seasons of scarcity the lines are drawn more closely. Some general conference among furnaces and a settlement of these questions would be of great advantage to them, and greatly facilitate business. Another abuse that has crept into the Western market, and which should be corrected without delay is the custom of giving 2268 pounds for a ton. This originated many years ago—in fact, years before the war, and grew out of the fact that pig iron molded in sand carried about this weight of sand as compared with foreign iron which reached here, and iron molded in iron molds, which was without the sand. We are glad to see the matter taken up and hope it will be agitated until these irregularities are settled. Yours truly,

G. H. HULL &amp; Co.

## Porcelain-Lined Iron Pipe.

HAMMONTON, N. J.

*To the Editor:* Can any of your readers inform me who manufactures porcelain-lined iron pipe 1½ to 3 inch? S. E. B.

## Nickeline.

WASHINGTON, July 14.

*To the Editor:* Please inform me who makes a metal known as "Nickeline," silvery, in rods, sheets and wire.

J. B. K.

## Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 17, 1888.

The tariff debate in the House is in its closing stages. The free wool provisions over which there was so much anticipated parliamentary skirmishing went through with barely a struggle. The vote, which stood on the Wilkins motion to strike wool out of the free list, yeas 102, nays 120, is regarded as a test. Although a larger vote is anticipated on the passage of the bill in the House the trial of strength on Monday settled the status of dubious Democrats and Republicans.

The protection Democratic wing mustered under the leadership of Randall when the discussion began not less than 11; when the vote was taken on free wool, which was the most important feature of the bill, and admitted to be a safe gauge of its strength, but three responded. The Democratic opposition in the beginning was made up of Randall and Sowden, of Pennsylvania, Vance, of Connecticut, Merriman, Stahlnecker, Greenmire and Tracy, of New York, McAdoo and Pickcock, of New Jersey, and Foran and Milkins, of Ohio, on Monday. Sowden, Foran and Milkins alone voted. Randall was ill and Merriman was absent from the city. Had they been present they would have swelled the list to five, which would still have been insufficient to defeat the provision. The defection was due to the careful and sagacious amendment of the bill by the Committee on Ways and Means in certain interests. This drew over the deserting members from the protection Democratic ranks into the rival camp and made the passage of the bill possible. The Republican support of free wool also failed to come up to the mark. Knut Nelson, of Minnesota, voted with his party, as did Anderson, of Kansas. Fitch, of New York, was absent. The only vote, therefore, which Chairman Mills received for his proposition from the Republicans was Anderson, of Iowa.

The final vote on the bill may now be reached at any time, and under ordinary contingencies not later than Saturday. There only remains to be discussed the administrative features, which are not likely to call forth any very earnest or protracted debate. The Senate sub-committee are hastening all in their power to have their substitute ready at the earliest moment. When the House bill reaches them they will go over its provisions as a matter of information, but will submit their substitute to the Senate as soon as completed, which will be in about two weeks. The determination of the sub-committee is to urge the passage of the substitute. The Democratic Senators show a disposition to discuss the measure. If they carry out such a programme the tariff debate in the Senate may run the subject well into September.

The Senate bill reduces the revenues by a very different method. The principal items are the repeal of the internal revenue taxes on tobacco and fruit brandies, and a portion of the duties on sugar and alcohol used in the arts, which will aggregate upward of \$60,000,000 or \$70,000,000. There will be opposition to removing the

tax on fruit brandies, as such a step, it is claimed, will open the way to evasion of the tax on spirits by claiming all spirits to be fruit brandy by the introduction of a minimum of fruit in the manufacture.

The West Point (N. Y.) Foundry Company and South Boston Iron Works made similar bids for machine finishing and assembling of six or twelve 6-inch steel breech loading guns. Their figures were, six 6-inch guns, \$20,400; time, 13 months, or 12 6-inch guns, \$40,800, in 19 months. The forgings will be finished by the Government as soon as possible. Each 6-inch gun will weigh about 10,000 pounds.

The bids for steel for the armored battleship Texas, to be built at New York, will be opened on the 23d inst. In August proposals will be wanted for materials for the armored cruiser Maine, to be built at the Brooklyn yard.

## The Cost of a Ton of Pig Iron in the Sequachee Valley.\*

BY WILLIAM M. BOWRON, SOUTH PITTSBURG, TENN.

An interesting calculation was made at the Chattanooga meeting of 1885 as to the cost of making a ton of pig iron in the Chattanooga and Birmingham districts. Since that time new territory has been opened, new railroads have been built and recent construction has remedied some of the leakages of former practice. The metallurgy of the ores of these districts and the capabilities of their fuels are now clearly sustained; but the old question, How much does it cost to make a ton of iron? is still unanswered, so far as popular knowledge goes. Cost-accounts are considered, in this district at least, as close secrets; and I am not prepared to betray them, for the excellent reason that I have never had access to the cost-account of any firm making iron in these districts.

Probably if I had sought such special information I could have got it, but it would not have been available for publication, and its possession would have rather been a source of embarrassment than aid in the independent investigation that I have made. Besides which there are peculiarities in the conditions of most firms that prevent them from being representative of their neighbor's practice. My first idea was to try to get in confidence such figures as might be averaged; but a very little study made me abandon this, if for no other reason than that the difference in matters that were included in cost would render such average worthless. For example, one operator builds 50 coke ovens and charges them up to "general expenditure." His neighbor, building the same number, charges them up to "capital account." The figures of cost on the same make and under similar conditions would not be identical. I now propose to give some data of cost that may assist those making their own calculations for any specific locality, premising that my figures are based on Sequachee Valley practice, as the district most familiar to me. It is but simple justice to the Tennessee Coal, Iron and Railroad Company to state that none of the figures have been derived from their work. Owing to their special facilities they work one department into another, and the figures I arrive at should not be quoted against them. I am dealing with a furnace built in Sequachee Valley to work its own local ore and coal to buy its soft ore. The materials included in Sequachee Valley are ore and coke. Hard ore is worth 75 cents per ton, and soft ore can be had for about \$2.25 per ton, delivered. A working mixture is:

Hard ore.....	4,200 pounds
Soft ore.....	3,500 pounds

\* Read at the Birmingham meeting of the American Institute of Mining Engineers.



Allowing the hard ore to run 30 per cent. and the soft ore 50 per cent., this charge would give 3010 pounds of iron. Reducing the ore to that required for 2000 pounds of iron we have:

Hard, 2757 pounds, worth..... \$1.034  
Soft, 2325 pounds, worth..... 2.615  
Add 10 per cent. for waste, moisture, &c. .365

Ore per ton of iron..... \$4.014

The next item is coke. Analyzing its probable cost I have from different sources and composite data got the figures below.

I have made an attempt to divide up the cost of mining as follows:

	Cents.
Mining coal.....	50.0
Air course and entry.....	12.5
Incline.....	.30
Superintendence, clerks and offices.....	.25
Mules, drivers and outside labor.....	.58
Tipple.....	.25
General expenses, i. e., taxes, insurance, exhaustion of land, &c.....	.75
Timber.....	.25
Total.....	87.3

On cars at mine. Coked in 11-foot ovens, holding 4 tons of coal, 100 bushels of this coal gives 115 of coke; or 8000 pounds of coal gives 4600 coke. The cost of this may be divided thus:

	Cents.
4 tons coal per oven.....	3.492
Charging, leveling, bricking and drawing.....	.500
Loading.....	.250
Repairs.....	.050
Extra labor, switching, weighing, &c.....	.150
Total.....	4.442

Or \$1.929 per ton of coke on cars at ovens.

To make a ton of pig iron with this coke takes 2748 pounds of coke, worth

Net cost..... \$1.929  
Waste and braise, 10 per cent..... .193

Total..... \$2.122

Or \$2.915 per ton iron, plus the freight for haulage from coal mines to furnace.

To recapitulate:

Ore..... \$4.014  
Coke..... 2.915

#### Labor.

We can only arrive at labor by considering the actual production of furnaces using similar materials to those under consideration.

The following wages and labor are taken from actual practice:

	Rate of wages.	Total wages.
2 engineers.....	\$1.90	\$3.80
2 firemen.....	1.25	2.50
2 keepers.....	2.50	5.00
2 first helpers.....	1.15	2.30
2 second helpers.....	1.10	2.20
2 third helpers.....	1.00	2.00
2 stovemen.....	1.10	2.20
1 blacksmith.....	2.00	2.00
1 helper.....	1.15	1.15
1 lampman.....	1.10	1.10
5 water boys.....	.40	2.00
4 cinder men.....	1.15	4.60
1 foreman cinder yard.....	1.15	1.15
14 laborers.....	1.15	16.10
4 horses.....	1.00	4.00
1 scrip man.....	1.25	1.25
1 scales man.....	1.40	1.40
1 scales man.....	1.30	1.30
2 cage men.....	1.15	2.30
2 top fillers.....	1.20	2.40
2 top fillers.....	1.15	2.30
9 ore fillers.....	1.00	9.00
8 coke fillers.....	1.00	8.00
4 ore breakers.....	1.00	4.00
4 ash men.....	1.00	4.00
2 water boys.....	.40	.80
1 foreman.....	1.45	1.45
25 1/2 laborers on ore in stockhouse.....	1.00	25.50
Total.....		\$115.90

Switch engine and yard crew..... 20.00

Superintendence and clerks..... 20.00

Total..... \$155.90

or an average make of 85 tons per day, or \$1.894 per ton. We have then:

Ore..... \$4.014  
Coke..... 2.915

Labor..... 1.834  
Stores..... .250  
(This includes railroad iron, oil, coke-forks, sand, lumber, &c.)  
Total..... \$9.013

being the cost of making a ton of pig iron less the cost of bringing the fuel to the furnace, which is supposed to be located near the mine in the Sequachee Valley, and 25 cents should cover it. There only remains to add for repairs and depreciation of plant 10 per cent. on \$100,000 investment and 6 per cent. interest on the same for use of the money (for the only safe way is to regard the money invested as borrowed). These, calculated on 30,000 tons per annum, are:

Depreciation..... \$6.25  
Interest..... .15  
Brought forward..... 9.012

Total..... \$9.413

Probable freight on coke..... .25

Total..... \$9.663

As this is a ton of 2000 pounds the cost of a ton of 2240 pounds will be, according to the above figures, \$10.82. The allowance for sand in the pig-iron ton does not require to be made here. Local conditions vary, but the figures above will come very near the truth in Sequachee Valley, where ore and coke are only 4 miles apart in a direct line, and can commercially be united by rail inside 20 miles. As a basis for comparison this estimate will be useful if only to check the wildly small estimates of the authors of "boom" literature and their residuary legatees, the tariff-tinkers. Unless conditions are favorable, construction suitable, and management good, these figures will be exceeded. Distance from market becomes a further factor in the question of "profit and loss," but I am simply regarding here the cost of making a ton of iron in Sequachee Valley.

## The Ohio Valley Centennial Exhibition.

Among further exhibits in the machinery department at the Ohio Valley Centennial Exhibition, at Cincinnati, which lack of space prevented us from noticing in our last issue, is one by the Universal Radial Drill Company, of Cincinnati. This company show their Universal drilling machines in several sizes, the machines being adapted to a large range of work. They exhibit also their radial drilling machines, with powerful gearing to spindle, quick return, automatic feed, combined horizontal and vertical faces to table, and pivoted arm having radial movement of over three-quarters of a circle. A new tool, a brass workers' Fox lathe, is also displayed. This machine has a new principle applied in the method of feed. A number of different sizes of bench and several upright drills complete the display.

The Cincinnati Screw and Tap Company show their Universal milling machines in different sizes, machine screws, taps, dies and die-stocks.

J. K. Krugg & Co., Cincinnati, Ohio, exhibit the Heine safety boiler, made by the Heine Safety Boiler Company, of St. Louis. Two of these boilers supply steam to the exposition.

The Diebel Mfg. Company, of Philadelphia, Pa., exhibit a complete line of their Challenge grinding and polishing machinery, emery wheels, &c., through their agent, H. H. Walter, Cincinnati, Ohio.

J. H. Day & Co., Cincinnati, Ohio, display dough-mixing machinery, power flour sifters, grinders and odorless cooking pots.

The Jeffrey Mfg. Company, Columbus, Ohio, exhibit their anti-friction roller

chain belting, detachable link belting, elevators, conveyers, coal mining machines and power coal drills.

J. J. Brown & Co., agents, Cincinnati, Ohio, exhibit several styles of Red Jacket force pumps.

The Lightning Fence Machine Works, Middletown, Ohio, make an exhibition of the Lightning Fence machine and its product, and also of force and common well pumps.

The Advance Mfg. Company, Hamilton, Ohio, exhibit a line of cider presses, ice tools, &c.

The Foos Mfg. Company, Springfield, Ohio, display the Scientific grinding mills and oil cake mills in several styles and sizes, also the Scientific portable forges.

The Lagonda Mfg. Company, Springfield, Ohio, also exhibit several grinding mills, crushers and the Eclipse post-hole diggers.

E. D. Shays & Co., Cincinnati, Ohio, show an extensive assortment of heavy hardware and factory supplies, including a full line of the Ashtabula (Ohio) Tool Company's productions, consisting of forks, hoes, &c., the Buffalo Forge Company's forges, blowers; also a line of up right drills, belting, &c.

Schaffer & Buddenberg, New York City, provide a very handsome display of brass steam gauges, &c.

The Edinburgh Pulley Company, Edinburgh, Ind., have on exhibition a large line of the Self-Locking Wood Split Pulleys.

The Walker Mfg. Company, Cleveland, Ohio, exhibit a line of steel-rim pulleys, patent molded gearing, power-transmitting machinery, shafting, hangers, &c.

The Eclipse Pump Company, Cincinnati, Ohio, have an interesting display of steam and air pumps in various styles and sizes, and boiler feeders.

The Gordon Steam Pump Company, Hamilton, Ohio, display heavy double-acting pumps, suitable for water-works and wherever great capacity is required.

The Cordesman Machine Company, Cincinnati, Ohio, show a variety of wood-working machinery, including band saws, carving machines, jig saws, boring machines and a spiral twist molder.

Post & Co., Cincinnati, Ohio, provide an extensive display of the Acme Machinery Company's (Cleveland, Ohio) productions.

The Cincinnati Brass Works have a well-arranged display of their lubricators, brass castings, automatic oil feeders, &c.

The Abendroth & Root Mfg. Company, New York, exhibit the Root water-tube safety boiler and spiral tubing, both japanned and galvanized.

The Lane & Bodley Company exhibit their compound Corliss engine, furnishing power to the exposition. The cylinders are 11 1/2 x 20 x 42. The engine is rated at 140 horse-power, with 95 pounds pressure and develops 1 horse-power with 17 pounds of steam per hour.

The I. & E. Greenwald Company, Cincinnati, Ohio, have one of their automatic cut-off engines in operation. These engines are built in sizes from 60 up to 200 horse-power.

Russell & Co., Massillon, Ohio, exhibit a line of their threshers known under the title of the New Massillon, the improved Dingee-Woodbury horse-power and Pitts-Carey horse-power, portable engines from 4 to 16 horse-power, 6 to 16 horse-power traction engines, saw-mill outfits, and their well-known Russell automatic engines, adapted to a large variety of work and ranging in size from 7 x 12 to 20 x 27.

A reduction of wages of 5 to 20 per cent. has been asked of the men at the Norway Iron and Steel Works, at South Boston, Mass. The men have discussed the matter, but have not yet reached any conclusion.

## Foreign Markets.

### EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	10.2
Florin (Netherlands).....	10.2
Florin (Austria).....	35.9
Milreis (Portugal).....	41.08
Milreis (Brazil).....	54.4
Mark (Germany).....	25.8
	Pounds.
Kilogram.....	220.5
Picul.....	134.

### WEST INDIES.

**PORT OF SPAIN, TRINIDAD, June 8, 1888.**—*Asphaltum*.—Our market has been steady under a good demand at \$14.04 per ton boiled and \$6.84 crude, both inclusive of export duty. Shipments since January 1 have reached 24,536 tons, as compared with only 12,202 tons last year and 11,846 in 1886. *Exchange*, 90 days' sight, \$4.74 @ \$4.80.—*E. P. Masson*.

### CHILL.

**VALPARAISO, June 1, 1888.**—*Nitrate*.—The Anglo-Chilian Nitrate and Railway Company, Limited, have secured 9½ square miles of Nitrate lands in the province of Antofagasta, near the river Loa, about 60 miles distant from the port of Tocopilla, between Iquique and Antofagasta. The Company sent a member of the board of managers to investigate the property, a Mr. Thackthwaite, and his report is favorable. Mr. J. E. Wood, formerly Sub-Inspector of Nitrate Fields on behalf of the Chilian Government, sends an equally favorable report, and so does Don Federico J. Roman, Engineer-in-Chief of the scientific exploring expedition that was sent to investigate the Atacama Desert. The report of the latter two men is all the more valuable as they have no interest, direct or indirect, in the matter.—*Ferro-Carril*.

### ASIA MINOR.

**SMYRNA, June 25, 1888.**—*Hardware*.—The Remscheid and Solingen Cutlery manufacturers of Rhenish-Westphalia have secured a good foothold in this part of Asiatic Turkey, so much so that the articles named have begun to supersede English, after ousting them out of the Needle and Packing-Needle trade. In Wrought Iron and Steel Belgium does the largest business in Asia Minor next to England. In Agricultural Implements and Machinery England remains prominent, in Sewing Machines Germany.—*Pera Gazette*.

### EAST INDIES.

**SINGAPORE, May 31, 1888.**—*Tin*.—Our last report was dated 6th inst.; since then there have been small sales at \$35 down to \$34.50, and buyers now offer \$34 for ready metal, or \$32 for distant delivery, but first hands have not sold a Slab since the collapse, and will continue to hold until forced by necessity to realize. Stocks here are estimated at 600 tons, and up country the quantity in hand is said to exceed 1000 tons. *Tonnage*.—Steamer rates to London are as last quoted, with a steady market. New York via Canal, a small amount of space is offering. Via Cape, the Emily L. Boyd is full, and will sail in a day or two, and the Steinvara has taken the berth alongside the W. Anton. Rates show no change. For Boston there is no fixture. The steamer Antenor took on the 3d inst. for San Francisco, 169 piculs of Tin. *Exchange* is weak at 3¼ for six months' credits.—*Giffillan, Wood & Co.*

**MANILA, July 9, 1888.**—*Hemp*.—There are buyers at \$8.37½ per picul, against \$8 same time last year, equaling £28. 10/, against £27. 5/ per ton, cost and freight; there were cleared for the United States since last cable, 6000 bales, against none in 1887; do. since January 1, 97,000, against 123,000; loading 2000, against 6000. Cleared for England since January 1: 184,000, against 107,000 bales; loading for do., 6000, against 10,000; cleared for all other countries 42,000, against 21,000; receipts at all ports since last cable, 13,000, against 10,000; do. since January 1: 314,000 bales, against 242,000, and 203,000 in 1887 and 1886, respectively. *Freight*, \$5.50, against \$5. *Exchange*, 3/5¼, against 3/5½.—*Ker & Co. to Charles Nordhaus, New York, per cable direct*

**CALCUTTA, June 2, 1888.**—*Jute*.—Crop prospects in this vicinity continue favorable. There are showers of rain almost daily, and the plant looks vigorous and healthy. The area under culture exceeds last year's by about 12%, so that consumers have prospects of a good supply, if nothing happens to thwart these expectations. As for prices the impression prevails that during the first two months of harvesting the crop prices will still rule high, but with ample receipts to date from October 1 there will be no reason why moderate prices should not rule after the first rush to buy shall have passed by. Our local spinners will compete lively for a supply, and it will greatly depend on their action whether the ruling will be high or kept sufficiently within bounds to stimulate domestic consumption. Advice from Naraingunge re-

port that so far the crop news there received remains encouraging. Rain was general, and the plant looked well. The rivers were rising rapidly. It was hoped that there would be no necessity to commence cutting till the plant shall have reached its full height. The cutting on the low lands will probably begin by the end of this month. Receipts from Betial and Chowrah may be looked for the first week of July. The area seeded is about 7% over and above last year's. During the week large telegraphic orders were received for early canal shipments, and a big trade was done at 5/ per advance. Balers have now sold August-September deliveries sufficient in amount to pause; any further orders would provoke a fresh improvement. We quote £11. 17/6 @ £12. 7/6 per ton, cost, freight and insurance, per steamer, September-October shipment.—*Times of India*.

**BATAVIA, June 29, 1888.**—*Tin*.—The sale of 14,000 piculs Billiton, on behalf of the Government, averaged 48.84 guilders per picul.—*Per Cable via Holland*.

### SPAIN.

**BILBAO, June 30, 1888.**—*Iron Ore*.—Certain descriptions of Ore are scarce, and to some extent there is, besides, a scarcity of miners; at the same time very little has been done in new contracts, and current business has almost arrived at a standstill, at the nominal rates of 7/6 @ 8/ for Campanil and 6/10 @ 7/3 for Rubios. Shipments hence since January 1 sum up 1,893,304 tons, against 2,255,200 last year. *Pig Iron*.—There were shipped during the week 1450 tons abroad and 80 coastwise.—*Bilbao Maritimo y Comercial*.

### ITALY.

**ROME, July 3, 1888.**—*Iron and Steel*.—In spite of the powerful assistance which the Government lends Iron and Steel industry in Italy, what has been undertaken so far has on the whole been the reverse of successful. The most recent failure is that of the Terni Iron and Steel Works, whose labors have given a very poor result, as is shown by the report submitted to the shareholders at their late general meeting. The production of Steel was 39,952 tons, worth 10,941,731 lire or francs, and that of Foundry Pig, &c., 13,308, worth 2,483,133 lire, being about one-half of what these works furnished Italian consumption the previous twelvemonth. The company have been laboring under financial difficulties, but these have been overcome by Government aid and advances made by leading banking institutions, but the balance-sheet shows a loss so far of 2,048,687 lire. It was resolved at the meeting to cut down expenses so far as feasible and strive to improve the condition of affairs through a course of strict economy.—*Sole*.

### GERMANY.

**HAMBURG, July 7, 1888.**—*Iron*.—The outlook in Rhenish-Westphalia has become less reassuring, mainly due to the continued stagnation in Finished Iron, intensified by the stock-taking during the last three weeks. *Pig Iron* has been flat, yet nominally sustained, there being no decline as yet in Iron Ore. Spiegel has been slightly better on more encouraging American advices, and 10% to 12% Manganese now commands 58 marks. Luxembourg Foundry Pig has been bringing 41 marks, and Forge ditto, 38.70; English Bessemer 43/ f.o.b. The rolling mills are booked for six weeks to come, no further, and the current demand for their makes amounts to very little. One of the few branches still flourishing is that of Boiler-Plate manufacture. Thin Sheets are, on the contrary, still neglected. Wire Rods suffer from the absence of an American demand, but Drawn Wire is active. Wire Nail manufacturers are in a bad fix, and their convention is on the eve of exploding. Both machine shops and foundries are still getting on tolerably well, but in nearly all other branches there is a growing complaint that prices are unremunerative because the raw material is too dear. *Metals*.—*Lead*.—Efforts continue to be made by Stolberg and other leading continental producers to constitute a general European Lead syndicate. There is some well-founded hope that they may ere long be crowned with success.—*Borsenhalle*.

**Freights on Iron.**—The Joint Committee of the Central Traffic Association and Trunk Lines have authorized a reduction of the iron and steel freight rates, which corresponds with the cut made by the Baltimore and Ohio between Pittsburgh and Eastern cities on June 26. The basis of the new tariff is 21 cents per hundred on carload lots, and 20 cents on cars from Chicago to New York. This makes the rates between Pittsburgh and New York 13 cents for carload lots and 16 cents for less; Pittsburgh and Philadelphia, 11 and 14, and Pittsburgh and Baltimore, 10 and 13. The Lake Shore and Michigan

Southern have issued their tariff to correspond to this reduction. Their rates between Pittsburgh and Rochester, N. Y., on bar iron, are reduced from 14 and 11 cents to 12 and 10 cents; between Pittsburgh and Syracuse and Utica, 16 and 13 to 14 and 11; Pittsburgh and Albany, 18 and 15 to 16 and 13; Pittsburgh and New York, 18 and 15 to 16 and 13.

### A Long Switch Rod.

According to the *Railroad Gazette* the Lehigh Valley is putting in at Glen Onoko, Pa., a gas-pipe connection for a switch, which is 1255 feet from the point where it is operated. The device is put in under the direction of Dr. H. K. Whitner, the patentee of the Whitner uni-lever switch. The station at this place is situated on a steep grade and on a short tangent. About 500 feet below the station the line curves sharply to the left, and at this point begins a third track, between the two main tracks. The third track is used for freight trains only, and the switch at the entrance of this track has hitherto been operated by the trainmen, who, when handling heavy trains down the grade, would detach the engine some distance above and run ahead rapidly enough to give time for a man to get off and turn the switch before the cars reached it. About 700 feet above the station (1255 feet from the switch) is a single man, and the new connection is put in to enable the switch to be tended by this man. The gas-pipe for the first 700 feet from the switchman's cabin is 1½ inches. At the end of this it crosses underneath the track, the bell cranks at these two turns being placed so as to act as compensators, and the pipe of the remaining distance is 1 inch in diameter. The pipe has to pass gentle curves in the track near each end, but it is run in straight lines and V-cranks put in to change the direction. The large pipe is supported every 10 feet and the smaller every 8 feet. This is believed to be the longest switch connection in use anywhere. At night the man in the cabin knows when a train has passed the switch by the movement of the tail lights, the curve in the line beginning immediately beyond the switch. In case of fog he would have to depend upon whistle signals.

At another point on the Lehigh Valley where Dr. Whitner's levers are in use, a range light is employed to facilitate switching at long distance in the night. The switch tender who is 264 feet from the switch and over 300 feet from the point where cars in going to the side track clear the main track, has a small light fixed on a post in such a position that the movement of the cars always hides the light from him while they are foul of the switch and exposes it to view as soon as they have gone far enough to clear. It will be interesting to know whether this long switch-rod works successfully, as the expansion and contraction, even with the best known methods of compensation, always make the exact movement of a switch a matter of difficulty and uncertainty when long switch rods are used. The rod with connections, &c., may be estimated to weigh fully 1500 pounds, and this feature alone constitutes a formidable difficulty in moving the switch.

Considerable misrepresentation has grown out of the fact that a lot of steel boiler tubes was shipped lately from Boston to the Babcock & Wilcox Company, at Glasgow, Scotland, a branch of the well-known American boiler-makers. We are informed that this shipment was due to the fact that the company found it impossible to fill a specification with steel tubes such as they could obtain abroad and were forced to have them made in this country.



# TRADE REPORT.

## Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,  
CHICAGO, July 16, 1888.

**Pig Iron.**—Inquiries are much more numerous than they have been, and buyers are showing greater willingness to close contracts for future requirements. Several important sales of Lake Superior Charcoal Pig Iron are reported, only one of which was made to the agricultural implement trade, the others being distributed among Malleable casting and Car-Wheel manufacturers and the general foundries. A sale of 600 tons of Lake Superior Charcoal was made for exportation to England, the particulars of which are elsewhere stated. A considerable quantity of Coke Mill Iron was sold at \$14 cash, but the purchasers are regarded as fortunate in securing a bargain, the transaction not being considered as an indication of weakness in prices. The market was thoroughly canvassed by them before closing their contracts, and they felt assured that they were getting bottom rates. Part of the Iron taken was Lake Superior and part Southern. Sellers insist that this purchase cannot now be duplicated, as Mill Iron has advanced from 25¢ to 50¢ per ton in the past few days under a revived demand from the rolling mills, which are signing the wages scale and getting ready to resume operations. Bessemer Pig Iron is again reported firmer under an improved demand, consumers finding their wants greater than they had anticipated. Quite a number of Western furnaces, which have been making Iron for the general market, have taken Bessemer contracts to the extent of their full capacity for the remainder of the year, relieving the trade in Foundry Iron to that extent. Sellers look forward quite confidently to an improved condition of affairs in a very short time. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, Nos. 1 and 2, \$25.25; do., Nos. 3 to 6, \$26.25; Southern Charcoal Foundry, No. 1, \$18; Jackson County Softeners, No. 1, \$17.50 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$16.50 @ \$17; No. 2½ and Open Bright, \$16; No. 3, \$15.50; No. 1 Mill, \$15 @ \$15.50.

**Bar Iron.**—The evident settlement of the wages controversy in favor of a continuance of the old scale leads a number of buyers to believe that prices will not be likely to go lower. Had a concession been obtained by the manufacturers these buyers would have expected a lower range of values. They now look forward to a stoppage of production by the mills finding themselves unable to realize cost on the present prices of materials and the agreed rate of wages, and are inclined to place their orders for such Iron as they may need. A number of season contracts are in the market from large establishments, while small manufacturing consumers are buying very liberally from mills and from jobbers. The usual mill quotation for Common Iron is now 1.65¢, half extras, f.o.b. Chicago, but some are asking 1.67½¢ @ 1.70¢, while others making a limited range of sizes are willing to take quite low prices on what they can supply. Splice Bars are weak under active competition for larger orders to go South, and are probably quotable at about 1.60¢ here.

**Structural Iron.**—Quite a demand is experienced for Beams and other shapes for building purposes. None of the orders are very large, but a number of them range from 75 to 200 tons. Store prices are as follows: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢. Carload lots from mill are quoted as follows, f.o.b. Chicago: Angles, 2.20¢; Universal Plates, 2.25¢; Tees, 2.45¢; Beams, 3.40¢. Notwithstanding the increased number of mills making Beams, and the reported decline in consumption, deliveries are not being made promptly, and builders are greatly annoyed.

**Plates, Tubes, &c.**—The demand for Plates has been excellent, and very favorable reports are made of the prospects for coming business. Tubes are a little firmer, the mills reporting the receipt of all the orders they can handle at present prices. Quotations from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

**Sheet Iron.**—Heavy purchasers do not seem to have secured all the stock they will need, as mill representatives are still in receipt of inquiries and are making some sales. They quote 2.95¢ for No. 27 Common, f.o.b. Chicago, in carload lots, but this price can now be shaded, as the wages trouble seems to be about settled, and there will be no shortage in the supply of sheets. Jobbers report the buying movement having begun in the smaller trade, starting up a little earlier than usual. Some sales have been booked for fall delivery. Prices from store are based on 3.10¢ @ 3.20¢, according to quantity, for No. 27.

**Galvanized Iron.**—The demand for mill lots continues to be very heavy, but prices are sagging, a noticeable change having occurred in the temper of trade in this respect. No quotable change has been made as yet, small lots still moving at 60 % and 5 % off for Juniata, and 60 % and 10 % off for Charcoal.

**Merchant Steel.**—Large buyers are beginning to make their appearance, but are slow to determine what they will do this year. Those who are out of stock are now buying in carload lots. Such orders, in connection with a fair stove trade, have made business good in the past week. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

**Steel Rails.**—The large orders in sight are still awaiting the negotiation of securities through the usual financial agencies, and, in the meantime, the local mills are forced to be content with orders for small lots. Carload orders are not despised, but received with pleasure and filled with remarkable promptness. Prices for this class of business range from \$32 to \$32.50.

**Old Rails and Wheels.**—In the absence of sales Old Iron Rails are nominally quoted at \$18 @ \$18.50. Small lots of Old Car-Wheels have been sold at \$18.50.

**Scrap.**—Buyers are still holding off, while the supply is rapidly increasing, and prices are therefore very weak. For Mixed Country Scrap dealers are quoting \$12. Selling quotations for Carefully Selected are as follows, per ton of 2000 lb.: No. 1 Forge, or Railroad Shop, \$17 @ \$18; Track, \$16.50; No. 1 Mill, \$13; Light Wrought, \$9; Horseshoes, \$16.50; Axles, \$22 @ \$23; Cast Machinery, \$12.50 @ \$13; Stove Plate, \$9; Cast Borings, \$8.25;

Wrought Turnings, \$10; Axle Turnings, \$12; Coil Steel, \$13.50; Leaf Steel, \$14.50; Locomotive Tires, \$15.

**Hardware.**—Heavy Hardware is moving more sluggishly, except Bar Iron and goods going with it into the hands of the manufacturing trade. The demand is quite strong from that direction. In Shelf Hardware the same irregularity exists as stated last week, some houses reporting a very heavy inflow of orders from all classes of customers, while others could dispose of a great deal more business if it would come their way. The explanation is probably to be found in the locality from which trade is drawn. The houses dealing largely with farming communities are directly affected at this time of the year by the concentration of energy upon the growing and ripening crops.

**Nails.**—A few large orders have been placed with the factories on private terms, but general trade in both Cut and Wire Nails has been quiet. Steel Nails are quoted by the representatives of factories at \$1.87½ @ \$1.92½, f.o.b. Chicago. Jobbers' quotations are still \$2.05 for small lots of Steel Nails, shaded according to circumstances, and \$2.50 @ \$2.60 for Wire Nails, the quantity governing the price.

**Barb Wire.**—No business is being done here in this branch of trade, as farmers now have no time to make or repair fencing. Nominal quotations on small lots continue at 3¢ for Painted and 3.75¢ for Galvanized.

**Pig Lead.**—About 400 tons were sold during the week, which opened at 3.90¢ for small lots of Desilverized, and subsequently declined to 3.80¢ @ 3.87½¢, in sympathy with the weakness in Eastern markets. On the 13th inst. the Chicago Department of Public Works opened bids for 100 tons of Pig Lead, the competitors being the Raymond Lead Company at \$3.97½ @ 100 and E. W. Blatchford at \$3.96.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,  
PHILADELPHIA, PA., July 17, 1888.

**Pig Iron.**—There is no change of any importance, and in all leading features last week's report would cover the market at this time. The supply of good Irons is not more than equal to the demand, and prices for such are easily maintained. With other descriptions there is less uniformity, and it is hard to define their position. The supply is only a fair average one, but consumers show no disposition to load up with anything that is not fully up to their requirements, hence there is a good deal of effort required to make sales at prices in proportion to the general market. In fact, it is not so much a question of price as it is of quality. For the present anything that the trade regard as of satisfactory quality will sell at from \$15.50 to \$15.75, delivered, for Gray Forge; \$17 @ \$17.50 for No. 2, and \$18 @ \$18.50 for No. 1, and a trifle more for special qualities. New brands or medium qualities cannot be quoted with much exactness, as there is very little doing, and what there is is usually on private terms. There is not much urgency to sell, however, and as a rule, asking prices are not far from those already quoted, although large lots could doubtless be picked up here and there on specially favorable terms. Evidently the market is a waiting one, and one that will respond easily to any new developments, favorable or otherwise. Meanwhile neither side manifest much interest in the matter, and from present indications the market is likely enough to continue in its present groove for some time to come. The decrease in the output noticed in last week's *Iron Age* shows a falling off in production since January 1,

averaging about 1,000,000 tons  $\bar{p}$  annum, which, doubtless, accounts for the moderate offerings, as well as the steadiness of the market at these very low prices. The starting up of mills in the West may also cause a firmer feeling in Pig Metal, as a portion of the recent weakness was based on the expectation of heavy offerings from the West. But in any event, there is not much danger from that source at the low prices now prevailing in Eastern markets.

**Foreign Iron.**—It seems hardly worth while quoting, as there is no probability of business being done, prices being much beyond what buyers can afford to pay. Bessemer is nominally \$19 @ \$20, c.i.f., duty paid, and 20 % Spiegel \$26 @ \$26.50. American Bessemer, said to be equal in quality to the foreign article, can be laid down at mills at less than \$18.

**Blooms.**—There is no change in prices, and only a small business doing at about last week's quotations, which are about as follows, with some concessions on large orders, say, Domestic Rail Blooms, \$28 @ \$28.50, Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$34 @ \$35  $\bar{p}$  "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

**Muck Bars.**—There is a little more inquiry, and holders are inclined to be firm at the low quotations now ruling, and in some cases are asking a shade more money. Sales chiefly at \$27 delivered, although in some cases \$26.50 has been accepted.

**Bar Iron.**—There is very little doing in Bars, and prices are something easier than they have been for several weeks past. This is because of the collapse of the lock-out in Pittsburgh and to a general desire to secure orders before competition becomes as active as seems likely that it soon will be. The demand is very light, however, and it is difficult to find buyers willing to take lots of any size. Under these conditions prices are hard to quote, as so much depends on quantity, specification and requirements as to quality. For the general run of orders some mills get 1.8¢ @ 1.85¢, while others have quoted as low as 1.75¢ for 100-ton lots. All depends on circumstances, but for the time being the outlook seems to favor buyers rather than sellers. Skelp Iron is more active, and, as several good-sized lots have been taken within the past two or three days, mills will probably be a little more independent. Sales aggregate to about 1500 tons, at from 1.8¢ to 1.84¢, delivered, with still further demand at the inside figure.

**Plate and Tank Iron.**—Prices are hardly as firm as they were a week or two ago, although the mills are all full for the current month. An order for 500 tons Bridge Plate was placed at less than 2¢, and unless for small orders or a specially good quality, this seems now to be an outside figure. Prospects are said to be a trifle better, but there are so many on the lookout for orders that it is almost impossible to avoid cutting, notwithstanding the unprofitableness of business at current rates, which are nominally as follows: Ordinary Plate and Tank Iron, 1.95¢ @ 2.05¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3.4¢; Fire-Box, 3.4¢ @ 4.4¢.

**Structural Iron.**—A very light demand is reported in this department, although there is still a good deal of work going on in connection with old orders. To-day the demand for small lots is better than usual, however, and as there is said to be a large amount of work to come out soon, it is possible that improvement is not very distant. Meanwhile prices

remain as before, say: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

**Sheet Iron.**—There is not as much doing as might be expected at this season, although mills manage to run full without accumulating much stock. Prices are irregular, but for small lots of best makes quotations are about as follows:

Best Refined, Nos. 26, 27 and 28...3½ @ 3½¢  
Best Refined, Nos. 18 to 25...3 @ 3½¢  
Common, ½¢ less than the above.  
Best Bloom Sheets, Nos. 26 to 28...4½ @ 4½¢  
Best Bloom Sheets, Nos. 22 to 25...4 @ 4½¢  
Best Bloom Sheets, Nos. 16 to 21...3½ @ 3½¢  
Blue Annealed...2.8 @ 3 ¢  
Best Bloom, Galvanized, discount...62½ %  
Common, discount...67½ %

**Merchant Steel.**—The general conditions of the market remain unchanged. Small lots of Tool Steel are selling more freely, and inquiries from large buyers indicate a heavier demand in the near future. Lots from store are quoted as follows: Tool Steel, 8½¢; Machinery, 2½¢ @ 3¢; Crucible Spring 4½¢; Open-Hearth Ordinary Spring, 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary do., 8¢.

**Steel Rails.**—There is not much business to report in this vicinity, and prices are still nominally \$30 at mill. It is pretty well understood, however, that orders have been accepted at a lower figure, and on firm offers from desirable parties would be accepted again, but buyers of that character do not appear to be very numerous at this time. In the absence of definite information of sales at lower figures, we quote \$30 at mill, nominal.

**Old Rails.**—Stocks here are so light, and are held in such a way, that there is practically no market at present. Sales at outside points, however, have been made at from \$21.50 to \$22, delivered at mills, with bids at about \$21, for Philadelphia deliveries.

**Scrap Iron.**—There is no change in this department, the demand being very slow, and prices without material changes. Sales chiefly at the range of prices as follows, say: \$19 @ \$20 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

**Wrought-Iron Pipe.**—Manufacturers report an increased demand, and quote prices with considerable firmness, while those in a position to make early deliveries are advancing prices accordingly. Discounts are quoted as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 52½ %; on Boiler Tubes 60 %.

**Nails.**—Not much doing. Small lots are sold for local delivery, but outside of this things are very quiet. Price is quoted at \$2.05 @ \$2.10 from store, with the usual discount on large quantities. The new "pool" to restrict production, as proposed by Western mills, fails to meet with much encouragement among Eastern manufacturers.

## Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,  
CHATTANOOGA, July 16, 1888.

As is usual through the South, mid-summer has brought a falling-off in general business. Collections are slow and money is hard to get. The banks are very conservative. There is a great pressure upon them in consequence of many holders of real estate notes being obliged to realize. Many purchasers of real estate are yet behind in their payments, which

must result in the end in some sacrifices and depreciation of values. Another thing that acts as a disturbing element in business is the agitation of the tariff and the uncertainty that exists in regard to the effect that the lowering of the duties will have upon the business of the country.

**Pig Iron.**—During the past week there has evidently been a better feeling in reference to good grades of Foundry Irons. At the present time there is not a surplus of such Irons in the South, and some stacks are much behind in filling their orders for these grades. It would not take a long continuation of these conditions to cause a perceptible advance in prices, for as matters now stand some of the furnaces are not in a condition to accept more orders, and in any event are disinclined to book orders for over 30 to 60 days ahead. There is a drug in the lower grades, but somehow there is no accumulation of any consequence in stocks, and nearly all the yards are showing a very clean appearance. To undertake to quote prices at the present time would be impossible, as where the sales amount to round lots they are generally on private terms. Quite recently the furnaces have found some difficulty in getting cars to make their shipments as fast as desired. Freights have undergone no change, being on a basis of \$2.25 to Louisville and Cincinnati and \$3 to St. Louis.

## Cleveland.

CLEVELAND, July 16, 1888.

**Iron Ore.**—The total shipments from upper lake ports to date aggregate 1,352,000 tons, against 1,540,000 tons up to a corresponding period last season. These figures do not, however, furnish a proper basis for comparisons, inasmuch as the season of 1888 was fully two weeks later in opening than that of 1887. While there are no reports this week of very large blocks of Ore having been sold, the market has been active, and the aggregate amount disposed of is quite satisfactory. Menominee and Gogebic non-Bessemer have sold with such freedom at \$3.50 that the season's output of many mines has been disposed of. Ore from the Champion and Republic mines, and, in fact, all first-class standard Ores, are still held at \$6  $\bar{p}$  ton—the price established at the opening of the market in May. Many of the local dealers report that a limit has been reached in the sales of Ore from the mines they represent. Vermillion Bessemer have probably been fully engaged, and it is doubtful if much more Gogebic Bessemer will be offered. Estimates regarding the amount of Ore already sold vary from 3,000,000 to 3,500,000 tons, with the probabilities favoring the lower figures. Vessel rates are firmly established at 85¢ from Escanaba, \$1.10 from Marquette, and \$1.15 from Ashland—a considerable reduction from \$1.50, \$1.75 and \$2.10 rate talked of by vesselmen early in the year. The up cargoes of Coal are very heavy, and ship-owners are not losing any money. Quotations are unchanged at \$5.75 @ \$6 for No. 1 Specular and Magnetic Bessemer; \$4.50 @ \$5 for Bessemer Hematites; \$3.50 @ \$3.75 for non-Bessemer Hematites; \$4.75 @ \$5 for Menominee Bessemer; \$3.50 @ \$4 for Menominee non-Bessemer; \$4.50 @ \$5 for Gogebic Bessemer, and \$3.50 @ \$3.80 for Gogebic non-Bessemer.

**Pig Iron.**—The market steadily improves. A very satisfactory business in the way of sales has been done during the week. Buyers are purchasing Iron for future wants with a freedom indicative of a termination to the long period of absolute idleness. Bessemer Pig is still the strongest Iron in the local market, bringing from \$1 to \$1.25 more  $\bar{p}$  ton than



was demanded in June. Probably 15,000 tons of Mill Iron have been sold during the week, while Foundry Iron has been inquired for with even greater freedom. Dealers look forward to a settlement regarding prices within the next week, when other than nominal quotations can be given.

**Old Rails.**—The market is lifeless, no sales of any importance being reported. Old Car-Wheels bring about \$19.50. Axles are in some demand.

**Coke.**—The price at the ovens is still \$1 7/8 ton, with concessions to large purchasers.

## Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,  
PITTSBURGH, July, 17, 1888.

The general industrial situation, so far as this district is concerned, continues in an unsatisfactory condition, and the outlook for an immediate improvement is not favorable. It is stated that there is a good deal of dissatisfaction on the part of the members in regard to the present standing of the Western Iron Association. It is claimed that some of them have acted in bad faith, having accepted the scale of the Amalgamated Association after having agreed with their brethren to resist. It was expected that some of them would sign, being in such a position that they could not very well help themselves, but others, it is claimed, acted in bad faith. Some of the members now threaten to withdraw from the association, while others want to have it reorganized. A forfeit is advocated of say \$10,000 to \$20,000 by each firm belonging to the association.

The great event of the past week was a coal-boat freshet, and the shipment of some 12,000,000 bushels of coal to down-river points, mostly for Cincinnati and Louisville, although a few tows go through to New Orleans. This is one of the largest coal "runs" ever made in July, and was a successful one.

**Pig Iron.**—There has been no important change in the situation since our last report, but as a number of firms have signed the scale and are expected to start up their mills an increased trade is looked for soon, as consumers, almost without exception, are known to be low in stock, and nearly all of them will have to buy before starting up. However, at present, as but comparatively few of the mills are running, there is not much Pig wanted, and brokers, almost without exception, report trade as being exceedingly dull, but they are hopeful of a change soon for the better, and, as already intimated, their expectations will no doubt soon be realized. The feeling pretty generally obtains that prices have touched hard pan, and furnacemen aver that the next move will be upward. It is generally agreed that there is no margin for profit at present prices, and while the market remains in its present condition there is not likely to be any increase in production. Stocks in first hands are reported light, as nearly all furnaces in blast have contracts and there is not much inducement to start up those now standing idle. Furnacemen say that not for years has the market been in a worse condition than it is at present, and they appear to be pretty confident that it cannot possibly get much worse. Prices remain about the same as a week ago, with the exception that possibly Bessemer is a shade weaker. We quote as follows:

Neutral Gray Forge.....	\$14.00 @	\$14.75, 4 mos.
All Ore Mill.....	15.25 @	15.75, "
No. 1 Foundry.....	16.75 @	17.00, "
No. 2 Foundry.....	15.75 @	16.25, "
No. 3 Foundry.....	15.00 @	15.25, "
Charcoal Foundry.....	21.00 @	23.00, "
Cold Blast Charcoal.....	25.00 @	28.00, "
Bessemer.....	17.25 @	17.50, "

**Muck Bar.**—The demand continues light, while prices remain unchanged,

\$26 @ \$26.50, cash. There has been but very little inquiry for several weeks. There are those who would buy on speculation if the price was low enough, but sellers are not any more numerous than buyers at prices quoted.

**Manufactured Iron.**—Business continues light, notwithstanding the strike; buyers do not appear to be at all apprehensive of anything like a famine, hence, as a rule, they continue to buy only as their immediate wants require. No doubt there will be an increased demand a little later on, but there is nothing in the outlook to indicate any particular activity, although there is reason to believe there will be at least a fair average fall trade. Prices are without quotable change. Bars, 1.70¢ @ 1.80¢; Plates, 2.10¢ @ 2.15¢; No. 24 Sheet, 2.70¢ @ 2.80¢, all 60 days, 2 % off for cash.

**Nails.**—The Nail trade continues in an exceedingly unsatisfactory condition. Demand is light and prices are unsettled and unremunerative. Manufacturers are refusing to cut card rates, but the fact that they are getting little or no business demonstrates that cutting is being done elsewhere. We continue to quote upon a basis of \$1.90 for 12d to 40d, 60 days, 2 % off for cash, in carlots and upward.

**Wrought-Iron Pipe.**—The general condition of the market continues exceedingly unsatisfactory, and the outlook is not regarded as being very promising for an immediate improvement. Prices continue so unsettled that they cannot be quoted with any degree of accuracy; some of the mills are standing idle and those in operation are not working up to anything like their full capacity. The great trouble is the lack of oil and natural gas developments as compared with what there was a year ago, when the Pipe mills had a demand for about all the Pipe they could make. There may be an improvement before the winter season sets in, but the outlook at present is not very encouraging.

**Old Rails.**—The market continues very dull and prices are weaker. We are advised of a sale of 500 tons American at \$20.75. Their is little inquiry. Some of the larger consumers are entirely out of the market, their mills being stopped, and until they are started up buyers in this district are likely to continue scarce. However, the stock of Rails is small and the offerings are light, and some holders appear to be as indifferent as the buyers.

**Steel Rails.**—So far as we can learn there has been little new business here of late. The Edgar Thomson Works during the past week made some large shipments by river to the Mobile and Ohio Railroad—three barges, containing about 1700 tons. These works are still working up pretty well to their full capacity, turning out from 800 to 1000 tons of Rails per day of 24 hours.

**Billets, &c.**—There is a continued good demand for Bessemer Steel Billets; nearly all the mills are oversold and some of them are indifferent about taking more orders at present prices, which we continue to quote at \$28 @ 28.50, cash. As to size, quality and delivery, Nail Slabs are still quoted at \$27.75 @ \$28.

**Merchant Steel.**—There is but little change to note in this branch of trade. Orders continue light, while prices remain unchanged. Tool Steel, 8 1/4¢; Crucible Spring, 4 1/4¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2 1/4¢. Singer, Nimick & Co. have started up their works with non-union workers, and they appear to be confident of success.

**Old Material.**—There is a very light demand for all kinds of material, owing to so many of the mills being idle, and prices are weak, but nominally unchanged.

**Railway Track Supplies.**—Demand continues light, and prices weak, but nominally unchanged: Spikes, \$2 @ \$2.10, 30 days, delivered; Splice Bars, \$1.75 @ \$1.85; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

## Cincinnati.

CINCINNATI, July 16, 1888.

**Pig Iron.**—The improvement in the local Pig-Iron market noted a week ago has continued to grow, and, while the individual sales have not been especially large, the volume of business in the aggregate has been fair, and in some instances furnaces have been enabled to obtain a further advance on prices current two or three weeks ago. Sales have been made of both Foundry and Mill, Coke and Charcoal Irons at prices somewhat in advance of those which could have been obtained at the beginning of the month. There have been no new developments, however, to influence the prices of Iron other than those noted some few weeks since. The improved weather and continued favorable crop reports have imparted a tone of confidence throughout business circles, and Pig Iron especially has reflected this improved feeling. The strike of the Iron-workers is apparently drawing to a close, and the producers of Pig Iron regard it as a feature of special significance, denoting a fair amount of business on hand at the mills, from which they draw the inference that the demand for Pig Iron will be increased in the near future. Most of the Southern furnaces are disposed to contract for little Iron beyond 60 days' delivery, even at an advance of 25¢ to 50¢ 7/8 ton. Buyers, however, are not disposed to make large contracts at present, although they are making more urgent inquiries. The market is still retarded by the amount of off grades for sale, but there is no great pressure to sell even such brands of Iron. About 15,000 tons of No. 2 Southern Mill Iron has been sold on the basis of \$13.25 @ \$13.50 7/8 ton, cash, Cincinnati. Between 3000 and 4000 tons Lake Superior Charcoal Iron has been sold on the basis of quotations. Prices current here, cash, f.o.b., are approximately as follows:

### Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @	\$17.00
Southern Coke, No. 2.....	15.50 @	16.00
Southern Coke, No. 3.....	15.00 @	15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.00 @	15.50
Mahoning and Shenango Valley ..	16.50 @	17.00
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.00 @	21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @	18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @	17.50

### Forge.

Strong Neutral Coke.....	13.50 @	14.00
Mottled Neutral Coke.....	12.50 @	13.00
No. 1 Mill Coke.....	13.75 @	14.00
No. 2 Mill Coke.....	13.25 @	13.50

### Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Mal- leable.....	20.50 @	21.50

**Manufactured Iron.**—Several of the local mills have signed the scale, and a number of others at Pittsburgh have yielded to the Amalgamated Association. It appears to be but a question of time when the Iron-workers will have gained their point. The demand for Bar, Sheet and Structural Iron has not improved materially, however; yet it would seem that a number of mills have contracts which require them to continue operations during the summer, and they cannot afford to remain idle when by paying the previous scale they may continue. There are some mills, however, which are not thus bound, and they are in no hurry to yield. It is claimed that the \$1.50 rate made for Manufactured Bar Iron was only current at Youngstown, the local mills adhering to the card rate as previously quoted: Bar and Sheet Iron—Common Bar Iron, 1.90¢

@ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

**Nails.**—There has been a fair jobbing demand, which has been steadily met at prices previously quoted, based upon 12d @ 40d, which sell at \$2 ¾ keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 @ keg.

**Old Material.**—An easier tone has been apparent with moderate sales of Old Rails at \$19.60 @ ton, cash, here, at the close. A round lot is offered at \$19.50, with \$19.25 bid. Old Wheels have ruled weaker, with freer offerings and moderate transactions at \$18.90, spot cash.

## Detroit.

WILLIAM F. JARVIS & Co., under date of July 16, report as follows: There has been no material change in the Pig Iron market here during the past week, except that a firmer feeling seems to exist among the Lake Superior Charcoal men. A number of large orders have been placed, in some cases for a year's supply, at prices that have ruled for the past three or four weeks, and from the number of inquiries received and the amount required it would seem as if the near future would show a considerable increase both in the number of sales and tonnage for this grade of metal. Ohio and Southern Irons have been quite active, although not as steady as Charcoal Iron. We quote the market to-day as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.00 @ 19.50
Lake Superior Coke, cinder mixed.....	18.00 @ 18.50
Standard Ohio Black Band.....	19.00 @ 19.50
Southern No. 2.....	17.75 @ 18.25
Southern Gray Forge.....	15.50 @ 16.00
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	19.00 @ 20.00

## Louisville.

LOUISVILLE, KY., July 16, 1888.

**Pig Iron.**—There has not been a great amount of business transacted for immediate shipment, though there have been sales in lots of from 300 to 400 tons made of Bright and No. 2 Foundry for future delivery. The disposition to make purchases that will run through the year is increasing, but the prices parties are willing to pay are very low. It is thought that if a conservative policy is pursued by the new furnaces in the South who shortly will have Iron for sale the market will slightly improve, notwithstanding the offering of new Irons, as the consumption of Iron is more than equal to the production at present. It is feared that in some cases the desire to make sales will cause Iron to be offered too low. If, however, prices are not cut, there is no reason why present figures should not be realized and a slight advance take place. There is a strong demand for Foundry grades, also for Mill Irons, which the furnaces are not able to fill. Bright Irons, however, are plentiful. The rolling mills in this vicinity have signed the scale and will resume operations at once.

Southern Coke, No. 1 Foundry.....	\$16.00 @ \$17.00
No. 2.....	15.00 @ 16.00
No. 3.....	14.50 @ 15.00
Hanging Rock Coke, No. 1 Foundry.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 1 Foundry.....	20.25 @ 22.25
Southern Charcoal, No. 1 Foundry.....	17.25 @ 17.75
Silver Gray, different grades.....	13.25 @ 14.25
Southern Coke, No. 1 Mill, Neutral.....	12.75 @ 13.75
No. 2.....	12.25 @ 13.25
No. 1 "Cold Short.....	12.25 @ 13.25
Charcoal, No. 1 Mill.....	13.25 @ 14.75
White and Mottled, different grades.....	12.00 @ 12.50
Southern Car-Wheel, standard brands.....	21.50 @ 24.50
Southern Car-Wheel, other brands.....	18.50 @ 20.50
Hanging Rock, Cold Blast.....	22.50 @ 24.50
Hanging Rock, Warm Blast.....	18.50 @ 19.50

## New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, July 18, 1888.

**American Pig.**—Deliveries from the furnaces to the consumers continue light, and very little new business is being done by sellers from any quarter. Southern furnaces are supposed to be very well filled up so far as the older concerns are taken into account, one of the leading companies being reported to have 83,000 tons of unfilled orders on their books. Very little is heard in this section from the new plants which have gone in or are about to begin operations. Virginia furnaces appear, however, to be offering Iron in this market on the basis of \$17.50, ex-ship, for No. 1, and reports from Albany state that this class of Iron, as well as some Lehigh and Schuylkill brands, are available there on the basis of \$18 a ton, which is equivalent to \$17.50 at tide-water. We continue to quote: Standard and choice Northern Irons, tide-water delivery, \$17.50 @ \$18.50 for No. 1 Foundry, \$16.50 @ \$17.50 for No. 2 Foundry and \$14.75 @ \$16 for Gray Forge.

**Scotch Pig.**—We quote: Coltness, \$19.50 @ \$19.75; Summerlee, \$19.25 @ \$19.50; Langloan, \$19 @ \$19.50, and Dalmellington, \$18 @ \$18.50 for large to small lots.

**Ferromanganese.**—Foreign 80 % Ferromanganese is being freely offered, ex-ship, at \$49.50, with the market in buyers' favor, and the possibility of shading this price somewhat on larger blocks.

**Bar Iron.**—The market is weak, quotations for carload lots, half extras, on dock, being 1.55¢ @ 1.65¢ for Common Iron, 1.65¢ @ 1.7¢ for Medium, and 1.7¢ @ 1.8¢ for Refined, with special qualities selling up as high as 2¢ @ 2½¢.

**Plates.**—We quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.4¢ @ 2.15¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.6¢ @ 2.75¢, and Fire-Box, 3¢ @ 3.25¢.

**Structural Iron.**—We quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢, delivered; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, 3.3¢, on dock.

**Steel Rails.**—The official report of the Board of Control for the 1st of July shows the sales up to date to have been 934,987 tons out of an allotment of 1,205,000 tons, the deliveries being 585,558 tons. Last year up to the same date the sales were 1,695,055 tons, while the shipments had been 907,351 tons, figures which clearly illustrate the different condition of the Rail trade this year. We may note sales during the week of about 9000 tons in a number of blocks, taken by different mills for Eastern delivery, at private terms. There are rumors of low sales both in the Eastern and Western markets. We continue to quote, however, nominally, \$30 for moderate lots at Eastern mill.

**Billets.**—During the past ten days there have been sales aggregating about 7000 tons of Low Carbon foreign 4-inch Basic Billets at private terms, the quotation for sailer shipment being \$28.50 @ \$29, ex-ship.

**Wire Rods.**—Foreign Rods are restricted entirely to the seaboard markets, the only sale of any magnitude reported during the week being one lot of 500 tons at private terms. Reports come from the West that American Billets are being sold as low as \$40 at Pittsburgh, a price which the foreign Rod cannot touch by a large sum. Abroad the market has somewhat receded, German Basic Rods selling at shipping ports at 104/. Freights, however, remain high, sailer rates being 7/6 @ 9/, which steamers command 10/

@ 12/6. We quote \$30.75 @ \$40 for forward delivery, and \$40.25 @ \$40.50 from prompt Rods.

**Old Rails.**—No business of any consequence is reported. For a lot of 2500 to 3000 tons in the South \$20 has been offered at Philadelphia and refused.

**Scrap.**—The only transaction reported is a lot of 150 tons of No. 1 Heavy Scrap at \$19, on barge.

**Fastenings.**—The market continues quiet, with Spikes at \$2 @ \$2.05 delivered and Angle Bars at 1.85¢ @ 1.9¢ delivered.

## Metal Market.

**Copper.**—Since our last week's report Chili Bars have come lower from London, because hereafter contracts for future delivery will include pretty much everything in the way of Refined Copper under the new rules adopted, instead of exclusively Chili Bars, as was the case before their recent adoption. Hence, from £80. 15/ spot, a week ago, they are now cabled £79, and futures have given way from £78. 5/ to £78, but Best Selected improved during the week from £76 to £76. 10/. Sales for the week 350 tons. Here the market has been moderately active and steady without any feature of interest, sales summing up about 1,000,000 lb, including July at 16.80¢ @ 16.85¢, August at 16.65¢, September and December at 16.35¢ and spot at 16.75¢. The Boston *Transcript* publishes revised tables showing the output of Copper mineral by the nine Lake Superior mines now producing to have been 26,537 tons in the first six months of 1888, against 24,553 tons in the same period of 1887. It points out that despite the decrease of 3014 tons in the Calumet and Hecla output by reason of the fire the aggregate output of the nine mines has increased 1984 tons. The product for the first six months figures up fully 40,850,000 lb of Refined Copper, or 3,000,000 lb increase over 1887. It is estimated, the paper referred to adds, that the product for the year 1888 will be fully 85,000,000 lb, against 76,660,000 lb in 1887 and 79,980,000 lb in 1886. Statistics of Copper in England and France were received by cable yesterday showing an increase of 4000 tons in the visible supply since the 1st inst. The process of withdrawal from English to French stores is, it would seem, still going on, evidently for the purpose of getting advances on the stock held by the syndicate. The total visible supply is now up to nearly 77,000 tons, of which about one-third is in France, against 52,000 a year ago and 62,000 in 1886. The import of American Copper into Liverpool and South Wales the first half year has been 14,322 tons Fine, against 4661 in 1887. Our cable refers to the new method of accepting other than Chili Bars as good delivery on contracts in London. The *Ironmonger* prints the following list of brands classed as "good merchantable" quality: Lake Superior, Baltimore Ingots, Wallaroo Cakes or Ingots, Burra Cakes or Ingots, Arizona Pig, with certificate attached; nothing below 96 % to be delivered. Best Select—Grenfell, Vivian, Nevill, Druce, Bibby, Lambert, C. C. C., Tharsis, Logan, Williams, Foster, Mason, Elkington, Bolton, Baxter, Landore, St. Helens, Roberts, Tough Ingots or Cakes—Grenfell, Vivian, Nevill, Druce, Lambert, Bibby, Tharsis, Williams, Foster, Mason, Elkington, Baxter, St. Helens, Bede, Grange, Rio Tinto, N. G. E. Ingots, Lota Ingots, Urmeneta Ingots. E. & Co., Hope, Lloyd, Mansfield Cakes or Ingots. Japanese Tiles, with certificate attached; nothing below 99 % to be delivered. Electrolytic Copper, with certificate attached; nothing below 98 % conductivity to be delivered. Chili Bars, G. O. B.'s, same condition as now



ruling in London, Liverpool or Swansea; usual warehouse. Each 25-ton lot to be in same port.

**Tin.**—At the time of our last report the London quotation for spot was £82. 15/, since when an advance to £85. 15/ has taken place, while futures improved from £83. 5/ to £86. the sales in the meantime aggregating 510 tons. The demand in this market has been limited, a moderate trade being done to supply consumption, and speculation being rather tame in spite of the London improvement. Following were the sales effected: 10 tons September, at 18.35¢ before the advance in London was cabled, and 30 tons August, September and October at 19¢ subsequently. In a jobbing way 19¢ @ 19½¢ is obtained at the close. Shipments from the Straits Settlements this way during the first fortnight in July were 150 tons, against 100 in 1887; to England 200, against 500. Since January 1 this way 100, against 2700, and in England 10,200, against 7100. **Tin Plates.**—The trade in Tin Plates has not been very active, but owing to the continued light stocks prices of spot Plates have remained unchanged. In futures for August, September and October delivery business has been done during the past week at prices lower than any previously reported. At the close the market is, however, a little firmer, owing to the advance in Pig Tin. We quote at the close, large lines, on the spot, Siemens-Martin Steel, charcoal finish, \$4.75 @ \$5.25; ditto, coke finish, \$4.75; Ternese, \$4.30 @ \$4.40; Bessemer Cokes, \$4.45 @ \$4.55, and Wasters \$4.30 @ \$4.35. Coke Tins are selling at 13/ in Liverpool for prompt delivery.

**Lead.**—The open market has been drooping, 500 tons selling at 3.95¢, while St. Louis is flat at 3.75¢. On the Metal Exchange 648 tons changed hands from 4¢ to 4.05¢, July and August, down to 3.95¢. In London Soft Spanish was sustained at £12. 12/6, but English Pig gave way from £13. 5/ to £12. 15/.

**Spelter.**—Common Domestic Spelter has been dull and unsettled at 4.45¢ @ 4.47½¢, while Silesian has been looking up again in consequence of a recovery in London from £15. 15/ to £16. 17/6, and the present quotation is 5¢ @ 5½¢.

**Antimony.**—The recent decline in the London market to £39 for Hallett has unsettled ours, and we now quote Hallett 94¢ @ 9½¢, and Cookson, 13¢ @ 13½¢, with a moderate trade doing.

Henry R. Merchant & Co., 2 Metal Exchange Buildings, London, have authorized Mr. Henry Gardner and Mr. Samuel Baer to sign jointly by proxy the name of their firm.

#### New York Metal Exchange.

The following sales are reported:

##### THURSDAY, JULY 12.

32 tons Lead, July.....	4.05¢
300 tons Lead, August.....	4.05¢
16 tons Lead, August.....	4.02½¢
32 tons Lead, August.....	4¢
50,000 lb Copper, July.....	16.80¢

##### FRIDAY, JULY 13.

75,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.95¢
16 tons Lead, September.....	4.02½¢
25,000 lb Copper, December.....	16.35¢
10 tons Tin, September.....	18.35¢
25,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.97½¢
50,000 lb Copper, August.....	16.35¢
100,000 lb Copper, July.....	16.80¢
100,000 lb Copper, July.....	16.85¢
50 tons Lead, July.....	3.95¢

##### MONDAY, JULY 16.

10 tons Tin, August.....	18.75¢
75,000 lb Copper, July.....	16.80¢
100,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.95¢
50,000 lb Copper, July.....	16.80¢

##### TUESDAY, JULY 17.

50,000 lb Copper, December.....	16.35¢
10 tons Tin, August.....	19.00¢
10 tons Tin, September.....	19.00¢
10 tons Tin, October.....	19.00¢

25,000 lb Copper, December.....	16.35¢
300,000 lb Copper, spot.....	16.75¢
50,000 lb Copper, December.....	16.35¢
48 tons Lead, August.....	3.95¢

## Financial.

The general outlook is more cheerful. Crop prospects are further improved and the probability of a foreign demand for surplus grain is strengthened by the latest advices; added to these circumstances is the prospect of renewed activity in the iron industries. The adoption of a free-wool clause in Congress, to take effect January 1, indicates progress on the tariff question. On the Produce Exchange a feature is an advance in wheat, due to stronger cables. Exporters bought more freely. Some of the Western flour mills raised their limits. Corn was easier. The harvesting of early crops in Kansas, Illinois and Southern Michigan has been attended by favorable weather. The Kansas Farmer claims for that State the best wheat crop since 1881, estimating the yield at 22 bushels per acre; corn larger acreage than ever before. The official crop report of the State of Michigan estimates the wheat crop at 15,911,653 bushels, which is less than the crop of last year by 6,811,847, and less than one-half the crop of 1885. Cotton in South Carolina, Alabama and Mississippi, and rice and sugar cane in Louisiana, are greatly improved according to the Government report. Henry Clews attributes the favorable feeling now current in Wall street to the excellent outlook for the crops more than to any other cause that can be named. A good corn crop, Mr. Clews holds, is of vastly more importance than that of any other grain. It is well to observe, however, as a check to undue elation, that the exports of breadstuffs from Southern Russia during the coming autumn are expected to be enormous. The trunk line situation is in a less favorable shape, inasmuch as cuts have been made on new classes of freight. Provisions were cut to 18¢ from Chicago, against 22¢ @ 25¢, the regular rate being 30¢. Live hogs were also dropped to 18¢ from Chicago to New York, 16¢ to Philadelphia and 15¢ to Baltimore, against the normal rate of 30¢, 28¢ and 27¢. Dressed beef was lowered to 6¢ to New York, 4¢ to Philadelphia and 3¢ to Baltimore. The rates on lead and wool were also cut. There is no movement toward a compromise of this trouble.

The Stock Exchange markets have generally been active and strong, but toward the close showed some weakness on realizing sales. The Northwestern situation caused uneasiness. Michigan Central broke down on the announcement that the Duluth, South Shore and Atlantic Railroad has passed into the possession of the Canadian Pacific. The recent action of the Grand Trunk in announcing an advance of rates on dressed beef to 30¢ has been followed by the Nickel Plate and Lackawanna lines, whose new tariff takes effect on the 21st inst. It was also stated that the New York and New England had made arrangements with the Poughkeepsie Bridge Company, whereby it would be enabled to make connections with the Erie and Delaware and Hudson roads. Foreign houses agree in representing that there has been liberal buying of American stocks abroad since the publication of the Government crop reports, confidence having increased. On Monday there were signs of reaction.

The bank clearings of 38 cities last week were \$908,215,328, a loss of 4.5 % as compared with 1887, and outside of New York \$342,088,697, a falling off of 1.9 %. New York decreased 6.2; Philadelphia, 12.5; San Francisco, 16.5; Baltimore, 8.7; Cincinnati, 9.1; Kansas City, 5.8; St. Paul, 18.7; Cleveland, 7.9; Galveston, 22.5; and Topeka, 11.5 %. Boston increased

1; Chicago, 6.8; Pittsburgh, 13.7; New Orleans, 15.9; Detroit, 13.4; Omaha, 28.1; Indianapolis, 15.5; Memphis, 32.5; Norfolk, 27.1; and Duluth, 53.3 %.

United States bonds purchased by the Treasurer under circular of April 17, 1888, amount to \$32,648,038.90. Cost at maturity, \$42,565,933.11. Saving, 4 per cents, \$9,243,325.80; 4½ per cents, \$674,568.41; total, \$9,917,894.21. The fact that bond purchases have dwindled to an insignificant amount causes no anxiety in business, neither does it practically affect the rates of interest. The weekly bank statement showed an increase of \$3,417,600 in surplus reserve, thus recovering the losses of the last few weeks. The excess now is \$27,731,600, which indicates a very strong position compared with one year ago. Loans were contracted \$1,070,200, while specie and legal tenders heavily increased. Money is easy at unchanged rates. We quote short dates, 4 @ 4½ %, but local institutions are inclined to keep their funds well in hand. Commercial paper is in fair supply in settlement of fall purchases, but not equal to the average at this season.

The general markets are dull. Dry good jobbers notice advance engagements for autumn fully a month earlier than usual; prices steady. Anthracite Coal is advanced in price and an early advance in tolls is proposed. In the grocery trade the sensation is a corner in raw sugar by Claus Spreckles as against the trust attended by a simultaneous advance by refineries in New York and San Francisco.

The imports at New York during June, which closed the fiscal year, amounted to \$39,795,650, showing an average far above that of most former years, while the exports for the same month were only \$26,720,292, exclusive of specie, which is the smallest June total for a long period. For the 11 months ending with May the total imports into the United States were \$719,153,390, and the total exports from this country to foreign ports were \$692,119,552, leaving a balance of trade against us of \$27,033,838.

The imports of merchandise at this port last week were valued at \$8,221,000, of which \$2,500,000 represents dry goods. Since January 1 the total imports are \$258,365,000, against \$253,916,000 for the same time last year. The exports for the week were \$5,167,183.

According to the Custom-House report the exports of specie from this port last week were \$2,413,000, making a total since January 1 of \$23,452,900, against \$10,617,000 for the same time last year. The imports of specie for the week were \$16,000; total since January 1, \$5,350,000.

The Bureau of Statistics reports that the value of exports of breadstuffs for 12 months ending June 30 is \$123,298,361, against \$162,427,205 for the year ending June 30, 1887. The total exports of beef and hog products for eight months ending June 30, 1888, \$53,015,029—a decrease of about \$800,000 for the same period of 1887. The total exports of dairy products for the two months ending June 30, 1888, \$1,887,857, against \$2,030,173 for corresponding months of 1887. The exports of mineral oils for year ending June 30 were valued at \$45,150,708, against \$45,423,474 for the preceding year. Exports of cotton for ten months ending June 30, 1888, 4,469,120 bales, value \$212,398,728; for corresponding ten months of 1887 4,271,291 bales, value \$195,744,588.

## Coal Market.

The Anthracite Coal trade shows more life, the recent advance having stimulated inquiry and given a stronger tone. The old schedule figures are now fully realized, unless the small steam sizes are excepted, the latter being in excessive supply. Pea

can be bought as low as \$2.40 and Buckwheat \$2 @ \$2.10 f.o.b. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50. Reading Hard White Ash is advanced 25¢ on Chestnut to \$4.40; 25¢ on Stove to \$4.50; 15¢ on Egg to \$4.25, and 10¢ on Broken to \$4.10—these prices to take effect immediately. Eastern orders are much more plentiful, and large quantities of Coal are going West.

Anthracite Coal production is increasing with the approach of the busy season. The total output for the week ending July 14 is 787,000 tons as compared with 771,000 tons for the week before, and 524,000 tons the week next preceding. Since January 1 the aggregate is 17,736,000, against 17,973,000 for the corresponding period last year. Of the output last week Wyoming contributed 444,000 tons, or nearly half the total. For the month of June, according to the official report, the production of Anthracite was 2,977,000 tons, an increase over last year of 257,000 tons. The stock of Coal at tide-water, June 30, was 741,958 tons, a decrease of 70,000 tons during the month.

Bituminous Coal is abundant at prices which the producers claim yield no profit. A fair trade is in progress.

The Pennsylvania Railroad has carried during the year nearly 6,000,000 tons of Coal, an increase of 608,000 tons compared with last year. The Reading shipped 40,000 tons of Coal to Port Richmond and Elizabethport last week. Vessels are reported in fair supply at Port Richmond, and freights are quoted at 90¢ @ \$1.05, and discharge to Boston. The freights from the Coal shipping ports in New York harbor are quoted at 70¢ @ 95¢ and discharge to Boston.

At Pittsburgh advantage has been made of the recent floods to ship down the river fully 10,000,000 bushels of Coal. Operators in the Southern trade petition the Government to require a 1000-foot span for the bridge at Memphis. Active work looking to the construction of a new railroad to connect the Philadelphia extension of the Baltimore and Ohio Railroad with the Schuylkill Coal region is in progress. The road will be 30 miles in length. The Dunn breaker, at Scranton, owned by John Jermyn & Co., was burned on Tuesday night; loss, \$100,000.

## Imports.

The imports of Iron and Steel, Hardware, &c., at this port from July 6 to July 13, inclusive, and from January 1 to July 13, inclusive, were as follows:

### Iron and Steel.

	July 6 to July 13, 1888.	Jan. 1 to July 13, 1888.
Pig Iron: Crocker Bros.	540	6,000
Naylor & Co.	800	4,275
G. W. Stetson & Co.	250	11,000
N. S. Bartlett	100	3,100
Jas. Williamson & Co.	100	2,600
Austin B. & Co.	100	100
Page, Newell & Co.	13	13
Spiegelstein: Naylor & Co.	406	5,251
J. A. Jansen	310	10,332
Crocker Bros.	98	1,664
Steel: G. Lundberg	100	101 1/2
W. F. Wagner	60	873
J. Abbott & Co.	13	203
F. S. Pilditch	12	205
R. F. Downing & Co.	10	177 1/2
A. Milne & Co.	10	957
Chas. Hugill	5	160 1/2
C. F. Boker	3	116 1/2
Newton & Shipman	3	107
Thos. Prosser & Son	2	18
J. Beaver Webb	1	1
Steel Rods: Lazard Bros.	220	497
Naylor & Co.	206	11,311
R. H. Wolff & Co.	85	2,395
Baldwin Bros. & Co.	53	53
Cary & Moen	5	559
Iron: J. Abbott & Co.	190	1,535 1/2
R. F. Downing & Co.	89	94
W. H. Wallace & Co.	4	4
E. G. Jacobus	1	25
Steel Billets: J. Abbott & Co.	135	1,242
W. H. Wallace & Co.	26	36
Steel Sheets: Pierson & Co.	56	558
R. Crooks & Co.	42	267

Naylor & Co.	38	408
Lalance & G. Mfg. Co.	37	442
Steel Blooms: Naylor & Co.	30	1,309
Steel Slabs: A. Milne & Co.	13	67
Naylor & Co.	10	113
Steel Bars: Union Bridge Company	1	259
Steel Forgings: Thos. Prosser & Son	143 1/2	2,722 1/2
Steel Tires: Temple & Lockwood	2 1/2	2 1/2
Rivet Rods: J. A. Roebling's Sons	188	605
J. Abbott & Co.	173	2,077
Naylor & Co.	50	150
Iron Blooms: R. F. Downing & Co.	5	5
Iron Beams: W. H. Wallace & Co.	43	254
R. F. Downing & Co.	4	169
Iron Girders: Lang & Bro.	68	68
Sheet Iron: T. B. Coddington & Co.	55	708
Screw Rods: American Screw Company	70	285
Scrap Steel: A. Milne & Co.	30	77
Wire Rods: J. A. Roebling's Sons	46	86
Iron Rings: Thos. Prosser & Son	4	5
Steel Bbl. Hoops: J. S. Leng's Son	125	255
Oil Bbl. Hoops: A. R. Whitney & Co.	200	300
Iron Pyrites: Emerson Foote	750	750
Ferromanganese: Naylor & Co.	42	42

### Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	15,718	273,759
Pitt Mfg. Co.	9,667	16,237
T. B. Coddington & Co.	8,224	85,593
G. B. Morewood & Co.	3,500	22,439
Dickerson, Van Dusen & Co.	3,379	142,849
H. R. Demilt & Co.	1,336	8,464
R. Crooks & Co.	1,075	37,378
N. L. Cort & Co.	712	58,096
Wolff & Roesing	634	17,908
Bruce & Cook	525	54,304
S. Shepard & Co.	375	11,284
J. Byrne & Son	200	30,571

### Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.	632,615	5,925,439
A. A. Thomsen & Co.	11,206	99,603
Spelter: Naylor & Co.	55,125	251,303
Copper: Lewisohn Bros.	111,812	111,812

Irons and Metals Warehoused from July 6 to July 13, Inclusive:

	Tons.	Pounds.
Old Steel Rails: Bowering & Archibald	200	
Spelter: Naylor & Co.		55,104

### Hardware, Machinery, &c.

Allen & Ginter, Tobacco Knives, cs. 4	
Barbour & Co., Machinery, cs. 5	
Boker, Hermann & Co., Arms, cs. 32; Mds., cs. 11	
Clark, G. A. & Bro., Mach'y, cs. 48	
Downing, R. F. & Co., Sheep Shears, case, 1	
Field, Alfred & Co., Arms, cs. 47; Mds., cs. 18;	
Gun Caps, cs. 16	
Folsom, H. & D., Arms, cs. 28	
Furman, H. C., Arms, cs. 11	
Godfrey, C. J., Arms, cs. 18; do. pkgs., 31	
Hartley & Graham, Arms, cs. 9	
Johnson & Co., Machinery, pkgs., 135	
Lewis & Conger, Hdws., cs. 6	
Lau, J. H. & Co., Arms, cs. 27	
Suthl. Aug., Mach'y, cs. 2	
Lengerke & Dennold, Arms, cs. 2	
Meacham Arms Co., Arms, cs. 24	
Merchants' Disp. Co., Arms, cs. 12; Hdws., cs., 1; do., cks., 10	
Oastler, W. C., Mach'y, pkgs., 11	
Powell & Clement, Arms, cs. 8	
Rotterdam S. S. Co., Arms, cs. 27	
Schoverling, A., Arms, cs. 36	
Sheldon, G. W. & Co., Hdws., cs., 15	
Taylor, Thos., Mds., cs. 8	
Windmuller & Roelker, Arms, cs. 5	
Webb, J. Beaver, Tire Bars, 10	
Webbush & Hilger, Lim., Mds., cs. 9; Arms, cs. 10	
Witte, John G. & Bro., Cutlery, cs. 6	
Order: Steelware, bds. 215; Ironware, cs., 6;	
Crank Pin, Forgings, 40; Hdws., cks., 10; Machinery, cs., 1	

### Exports of Metals.

	July 6 to July 13, 1888.	Jan. 1 to July 13, 1888.
Copper: J. Abbott & Co.	38,002	3,879,022
Lewisohn Bros.		2,581,293
F. A. Lomal		4,442,453
American Metal Company	100,000	223,939
J. Bruce Ismay		112,000
S. Mendel		560,000
Ledoux & Co.		110,276
Muller, Schall & Co.		430,000
Copper Queen Con. M. Company		224,034
J. Kennedy, Tod & Co.		112,026
H. Becker & Co.		1,250
Orford C. & S. Rfg. Company		224,881
Robt. M. Thompson		125,000
Thos. J. Pope, Sons & Co.		765,880
J. Parsons & Co.	138,750	206,250
Bridgeport Copper Company		112,000
C. Herold		250,000
Phelps Bros.		6,250
R. W. Jones		189,984
Copper Matte: Williams & Terhune	1,000,835	30,994,740
Lewisohn Bros.		3,021,610

American Metal Company	1,272,563
J. Abbott & Co.	205,000
C. Ledoux & Co.	485,800
F. W. J. Hurst	184,288
G. H. Nichols	722,777
H. T. Nichols & Co.	180,966
Old Brass: Burgess & Co.	1,392
Old Copper: Burgess & Co.	21,061

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, July 18, 1888.

The Block Tin market has been quite active again the past week, and governed almost wholly by speculative manipulation under the guidance of operators supposed to be working in the interest of producers. Consumers have a considerable supply on hand, and quite liberal amounts due on purchases of three months' contracts made some time ago. This fact and the accumulation of supplies at primary points encourage "bear" operations to some extent. The producers and their allies continue to hold supplies back to greater or less extent, however, and take the aggressive in the speculative market, presumably trusting that the "short" sellers will ultimately experience difficulty in covering their contracts without forcing prices higher. In any event it is certain that all attempts to depress prices are stubbornly resisted. Prices are now £3 @ £4 higher than a week ago.

The most interesting feature in the Copper market has been the working of the new form of contracts involving deliveries of other brands, equal to or better than Chili Bars. The previous opposition to the innovation seems to have completely died out, and the syndicate have been liberal purchasers under the new form of contracts. This, in turn, has served to improve prices, and the market shows better tone at the present time than a week ago. However, the breaking off of the late agreement between the English associated smelters and the continued transfer of large blocks of Chili Bars from England to France is not without prejudicial effect upon outside speculation.

The transactions in Copper furnace material continue to be on a small scale and at not particularly firm prices. Messrs. James Lewis & Sons' report, of 15th inst., notes a sale of 35 tons American Matte at 13/9 per unit, the first transaction in that class of material for six or eight weeks.

The demand for Tin Plate has been limited, and those buyers who manifest any disposition to take hold insist upon prices lower than have been accepted at any time since June 1. Sellers are firm, however, in view of the tone of the Block Tin market and some appearance of improvement in Pig Iron prices. The production is now on a very liberal scale, but stocks show no remarkable increase. The total at British shipping points is now 226,000 boxes, against 204,000 boxes a year ago, and about 195,000 boxes on January 1.

The Scotch Pig Iron market is affected in a degree by speculative operations governed in a good measure by outstanding engagements. The latter, together with a better demand from consumers for makers' brands, impart more or less firmness to values. Hematite warrants are held largely by merchants who purchased freely some time ago, when prices were at a very low





## Hardware.

During the past week the market has been quiet and dull, the demand being small and prices continuing in most lines without important change. Manufacturers and merchants are pursuing a conservative course and avoiding overstocking. While the market is thus not as strong and active as might be desired, the eminently satisfactory condition of things throughout the country at large is to be borne in mind, with the prospect of at least a fair fall trade.

### Barb Wire.

Prices in this market are nominally unchanged, but with the limited demand and the condition of the business in the West manufacturers would probably be disposed in some cases to shade quotations if necessary to meet the views of their customers. Regular quotations are as follows: Carload lots, 4 cents; 3-ton lots, 4.15 cents, and small lots, 4.30 cents.

The Braddock Wire Company, Rankin, Pa., St. Louis office 821 South Twenty-first street, announce that in the suit of the Washburn & Moen Mfg. Company and I. L. Ellwood against them the complainants withdrew, July 2, their motion for injunction. Referring to this matter the Braddock Wire Company and the St. Louis Wire Mill Company advise us as follows:

The Washburn and Moen Mfg. Company and I. L. Ellwood & Co. have about ten suits for infringements of Barb-Wire patents pending against the St. Louis Wire Mill Company and the Braddock Wire Company, and most of these suits are in the Eighth Judicial District, of which Judge Brewer, of Leavenworth, Kan., is circuit judge. He is the only United States judge who sustained the Glidden patent. The St. Louis Wire Mill Company are ready and willing to stipulate to go to trial before this identical judge, who formerly sustained the original Glidden patent, on 90 days' notice. We think if they have any patents which they think are valid they would certainly prefer to take their chances before the only judge who ever sustained them, and we therefore make this proposition, which will be good if accepted within 30 days.

### Cut Nails.

Buying continues only from hand to mouth, and chiefly in small lots. There is still some irregularity, which, however, it is stated affects only those brands which are not recognized as standard. We continue to quote \$1.90 to \$1.95 for carload lots on dock and \$1.95 to \$2.00 for small lots from store. The feeling in the trade here is that the chances of securing anything like general adhesion to a Nail pool among Eastern manufacturers are very slight indeed.

### Miscellaneous Prices.

The recent action of the manufacturers of Carriage Bolts in reducing their prices is generally regarded as having been a wise move in its bearing toward the discouragement of outside competition, and also in keeping the goods at a comparatively low price, yielding a fair but not exorbitant profit. In this respect they have avoided the mistake into which similar organizations of manufacturers frequently fall. At the same time the material reduction in price and the narrowing of the margin for the jobbing trade have been regarded by them with some disfavor, and some of the wholesale houses, especially those who had recently purchased additional Bolts, so as to get the quantity discount, are disposed to complain of the hardship of the situation, particularly in view of the fact that their margin of profit on the goods is here-

after to be narrower than it was. This latter feature of the case is, however, referred to by the manufacturers as necessitated by the fact that the jobbers throughout the country were in most cases underselling the manufacturers, giving away a portion of their rebates.

The market for Augers and Bits is in a very good condition and is characterized by more regularity than usually prevails in this line. Extreme prices have been withdrawn and the goods are held at somewhat higher figures, the market continuing steady and firm. The fact that the business of William A. Ives & Co. is being carried on conservatively by Mr. Ives' executors has its bearing on the tone of the market.

The manufacturers of Cast Butts have been conferring with reference to prices and considering the feasibility of reaching an understanding which will secure regularity in this line of goods. We are not advised that anything definite has been accomplished in this direction.

The Clark Mfg. Company, Buffalo, have announced the following revised discounts for Clark's Surface Blind Hinges and Gate Hinges and Latches:

	Per cent. discount.
Blind Hinges.....	75, 10 and 5
Gate Hinges and Latches.....	60, 10 and 5

They state that they can furnish either "Old Pattern" or the "Tip Pattern" Blind Hinge. The following price list is appended:

	Per doz. sets.
Nos. 1, 40 and 50.....	\$3.50
Nos. 3 and 45.....	6.25
No. 5.....	12.50

The manufacturers of Nuts are announcing the new price of 5½ cents off list, which went into effect July 1.

With the recent changes which have taken place in Oakum, we revise our quotations as follows:

Government.....	per pound, 8 cents
U. S. Navy.....	per pound, 7 cents
Navy.....	per pound, 6 to 6½ cents

The general features of the market on Wrought-Iron Pipe continue as at our last report. Manufacturers are holding to the advanced quotations, and the market is characterized by firmness with a fair demand.

Since our last report there has been an advance of ¼ cent in the price of Sisal Rope, making an advance of ½ cent within a short time. The stock of Sisal Hemp is reported to be exceptionally low with no prospect of any great increase in the supply until the new crop comes in. For this reason the market is regarded as exceptionally firm.

Tinware is selling at somewhat irregular prices, and dealers who have not recently received revised quotations from manufacturers will do well to look into the market carefully. There has not been a material change in price, but the tendency is toward somewhat lower figures than those which prevailed some time ago. Net prices are frequently made lower than those generally given by a discount from the list.

Goulds & Austin, Chicago, Ill., issue a postal calling attention to the Imperial Hose Reel, which they offer at 60 cents. They also quote Competition Hose, ¾ inch, at 4½ cents per foot.

The market for Tacks is in a decidedly unsatisfactory condition for the manufacturers, competition continuing very active, and exceedingly low prices being in some cases made. At some of the quotations which are current it is a question whether the manufacturers can supply the goods without materially scrimping the weight, and it will be well for the trade to look into the weights of any Tacks they pur-

chase. The frequency with which short weights are supplied is one of the features of the Tack market which must be borne in mind by the careful buyer.

The E. C. Meacham Arms Company, St. Louis, Mo., are making the following quotations on 10 M assorted lots of the goods named:

Cartridges, 45-70, 500-Grain Bullet, Copper Shells, U. S. Gov't make, outside Winchester Primer, per M., at.....	\$22.00
The New Winchester 45-70 Model, 1886, will take the U. S. Cartridge 45-70, 500-grain Bullet, and do better work than with any other Cartridge.	
Cartridges, 50-70, Brass Shells, Winchester make, per M., at.....	\$30.00

### Firearms.

Hartley & Graham, 17 and 19 Maiden Lane, New York, have issued, July, 1888, a price list of Guns, Revolvers, Ammunition and Sporting Goods, with quotations to the trade. It is a well printed and well arranged pamphlet of 44 pages, in which many leading Arms are illustrated, with list prices and discounts or net figures. The list of Ammunition is also given, without quotations, however, and with an intimation that discounts will be furnished on application. Some specialties in the same line are also shown. As representing a very complete line of these goods, and giving some interesting quotations, the price list will be appreciated by the trade.

The E. C. Meacham Arms Company, St. Louis, Mo., have sent out very widely to the trade the following quotations on Firearms, in which it will be observed that some specially low prices are quoted. It is stated that only the quantities named will be furnished at these prices:

25 Remington Floberts, P. Grip, Light 22, No. 2, at.....	\$2.30
25 Remington Floberts, P. Grip, Heavy 22, No. 3, at.....	2.75
25 Warrant Floberts, P. Grip, Light 22, No. 4, at.....	2.65
25 Warrant Floberts, P. Grip, Heavy 22, No. 5, at.....	3.50

### Case Lots, B. L. Single Guns.

Semi-Hammerless, 12-gauge, \$8.50; 10-gauge, at.....	\$10.50
XL Shot Guns, 38, at \$5; 44 at.....	6.00
Remington System, 20-Gauge, 30 inch, at.....	5.50
Case Lots, Zulu, 12-Gauge, at \$2.65; 100 lots at.....	2.50
Springfield, 16-Gauge, 32-inch, at.....	4.50
Champion, Side Snap, 12-Gauge, at \$6.50; Twist, 12-Gauge, at.....	7.25
Champion, Top Snap, 12-Gauge, at \$7.50; Twist, 12-Gauge, at.....	8.25
Champion, Side Snap, 10-Gauge, at \$5; Twist, 10 Gauge, at.....	5.50
Champion, Top Snap, 10-Gauge, at \$6; Twist, 10-Gauge, at.....	6.50
H. Richards, Top Snap, 10-Gauge, at.....	7.00
Forehand & Wadsworth System, 10-Gauge, \$7.50; 12-Gauge at.....	7.00
Champion, Hammerless, P. G. P. F., Rubber Butt, 12-Gauge, at.....	6.50
Champion, Hammerless, P. G. P. F., Rubber Butt, 10-Gauge, at.....	6.50

### 25 Lots B. L. Double Guns (Assorted).

No. P., Lefauchaux, 12-Bore, at \$5.65; 10-Bore at.....	\$5.90
Bonehill, No. 28 E, 30 to 32, Choked, at.....	17.00
Bonehill, No. 36 E, 30 to 32, Choked, 10-Bore only, at.....	18.00
1023, English, Side Snap, Back-Action, 10 and 12-Gauge, at.....	8.75
1180, Same Reb. P. G., 12-Gauge only, at.....	9.50
English Side Snap Bar, 10 and 12-Gauge, at.....	10.75
English Top Snap, Bar-Action, Reb. P. G., 10-Gauge, at.....	11.50
English, Top Snap, Bar-Action, Reb. P. G., Ex. Rib., 10-Gauge only, at.....	13.50
International Top Snap, Back-Action, \$14.85; Bar-Action at.....	18.85
International Side Snap, Laminated, Pistol-Grip Rebouncing, at.....	9.85

### 100 Ass't Dbl. Act'n Plated Revolvers.

	Net Cash.
44 C. F. British Bull Dog, Wood, American make, at.....	\$1.25
32, 38 and 44 American Bull Dog, at.....	1.50
32, 38 and 44 Imported British Bull Dog, at.....	1.40
32 and 38 XL Bull Dog, Regular Hammer, at.....	1.60
32 and 38 XL Bull Dog, Folding Hammer, at.....	2.20



41 Remington Double Derringers, at.....	4.05
32, 38 and 44 F. & W. British Bull Dog, Rubber and Reb'dg, at.....	1.70
32 and 38 Forehand & W. Automatic, at.....	5.50
38 American Arms Co., Single Action Shell-Ejecting, at.....	3.00
38 American Arms Co., Double Action, Shell-Ejecting, at.....	4.00

*Straight Grip New Guns.*

5 Parker Bros.' 10-Bore, 32-inch, 10 to 10½ lbs. List, at \$55; Net, at.....	\$27.50
5 Colt's 30 and 32-inch, 12-Bore, 7½ to 10 lbs., 10-Bore, 8 to 10½ lbs. List, at \$50; Net, at.....	27.50

*Case Lots Single M. L. Guns.*

No. 3, Davis System, 32 to 34-inch, at.....	\$2.75
Model '42 Muskets, at.....	1.50
Model '58 Cut-Down Blued, at.....	1.75
Model '82 Blued, at.....	2.00

*Will Sell in Case Lots as follows:*

10 Spencer Repeating Shot Guns, at.....	\$25.00
20 Springfield Rifles, 45-70, Wind-Gauge Sights, at.....	9.00
20 Springfield Military Rifles, 50-70, with Bayonet, at.....	5.50
20 Sharps Borchardt Military, 45-70, Re- finished as new, at.....	6.50
20 Springfield Rifles, 45-70, with Bayo- net, at.....	6.00
20 Whitney-Kennedy Rifles, Octagon, 40- 60 and 45-60, at.....	8.75
10 Sharps Sporting Rifles, '74 Model, 45-70, 30 in Oct., D. T., at.....	9.00
50 Flobert Rifles, Extractor on Barrel, B. B. Cap, at.....	1.50
10 Remington Guns, '82, 10-Bore only, 30- inch, 8½ lbs, at.....	20.00
80 Bags Shot, Patent, at \$1.15; Chilled, at	1.40

**Items.**

A meeting of the National Association of Carriage and Wagon Axle Manufacturers was held in the Monongahela House, Pittsburgh, on Wednesday, the 11th inst., President B. L. Sheldon presiding. The reports of some committees were read, and careful attention was given to reports as to the general condition of the trade and other matters of interest to the association. The following officers for the ensuing year were chosen: President, B. L. Sheldon; first vice-president, F. W. Wooster, of Brooklyn; second vice-president, G. H. Laughlin, of Cleveland; third vice-president, N. G. Park; treasurer, G. F. Smith, of Fort Plain, N. Y.; secretary, J. C. Lee, of New York.

A wholesale department has been opened at Nos. 11 & 13 South Canal st., Chicago, by the American Well Works, of Aurora, Ill. A stock of their own goods will be carried, and in addition a full line of Iron Pipe, long Couplings, plugged and reamed Pipe for Tube Wells, Artesian Tubing and well supplies generally.

The Grand Rapids Refrigerator Company, of Grand Rapids, Mich., have issued a circular in which, among other things, they call the attention of the trade to the fact that owing to the great number of houses in which steam heat is being placed there is a much greater demand for Refrigerators during the fall and winter than formerly. The capacity of their new factory is now 100 Refrigerators daily. It will be run to its full capacity during the summer, fall and winter to accumulate stock, so that prompt shipments can be made in the future. Their assortment of Refrigerators is now complete.

The National Carriage Spring Manufacturers' Association held a regular meeting at the Monongahela House, Pittsburgh, on Wednesday, the 11th inst. E. H. Bourne, of Cleveland, was chairman, and G. S. Smith, of Fort Plain, N. Y., acted as secretary. There was an unusually large attendance, members being present from all over the country. In contrast with the Axle manufacturing business, the trade in Springs was reported to be in a very favorable condition. It is not only good at present, but the outlook is very encouraging. The advisability of merging the organization into the National Carriage Builders' Association was discussed. It was unanimously decided to go into the general association. A committee of three

was appointed to attend to the preliminaries necessary to the consolidation. The committee was composed of E. H. Bourne, of Cleveland, president of the National Carriage Spring Association; G. S. Smith, of Fort Plain, N. Y., and E. R. Irwin, of Pittsburgh.

The Chicago Wire and Spring Company, 154 Lake street, Chicago, now own and operate the works of the late Grant Wire and Spring Company, at Lockport, Ill. They manufacture Tinned and Spring Wire, but devote special attention to the production of Upholsterers' and Cabinet-Makers' Springs, finding the best outlet for their works in that direction. They aim to produce a high quality of goods and find their efforts are appreciated. The demand has so greatly increased that they have been obliged to put more machinery in their Spring department this month to enable them to fill orders with reasonable promptness. Millard R. Powers is president and J. C. Reynolds is secretary and treasurer of the company.

The trade will observe the advertisement on page 63 relating to Peter Wright's Anvils and calling attention to an imitation of their brand, against which the trade are cautioned.

The Todd-Donigan Iron Company, Louisville, Ky., have issued a very convenient and creditable catalogue, the first published since the organization of the company in 1881. It relates to supplies for mines, railroads, machinists, quarrymen, blacksmiths, boiler-makers, wagon-makers, fence builders, carriage-makers and railroad contractors, which are appropriately classified and fully illustrated in a substantially bound volume of 337 pages. It is evident that care has been taken in the preparation of the illustrations with a view to securing quality and effectiveness. Many of them, we are advised, were prepared especially for this volume, and made in Louisville, where also it is interesting to observe the fine paper of the volume was manufactured, the printing, binding, &c., being all done in that city, to which the excellence of the workmanship is very creditable. The large line of goods represented in the volume are carried in stock; some of them, such as Turn Buckles, Wire Rope Fastenings, Wire Rope Clamps, &c., as well as those goods shown on pages 63 to 75, including Hoisting Machinery, Derrick Castings, &c., are not kept in stock by other houses in that section.

In their advertisement on page 71 the Jetter Mfg. Company, Buffalo, N. Y., call attention to their goods, including Files, Screw-Drivers and Wrought Goods.

Horton, Gilmore, McWilliams & Co., Chicago, Ill., under date July 15, have issued a 16-page price current, in which they represent a line of Tin Plates, Metals, &c., Tin Shingles, Freezers, Water Coolers, Window Screens, Bicycles, Campaign Torches and other goods.

Our readers will observe the Special Notice on page 49, in which a gentleman of long experience in the Wholesale Hardware and House-Furnishing business announces, under the *nom de plume* "Energy," his desire for a position in this city or elsewhere. His qualifications are referred to, and the fact that the best references can be furnished.

Whitfield & Jacobs, Pontiac, Mich., manufacturers of the Buckell Safety Clevis, advise us that they have recently made a great improvement in the appearance of their Clevises by giving them a handsome coat of Japan. They are also furnishing to dealers who desire them a well-finished sample board to hold one each of the different sizes of their Clevises. They are made in easel form to stand on the counter or floor, are painted bright red

and varnished, and when furnished with the Japanned Clevises are said to be very attractive in appearance.

Carl F. Boker, 93 John street, New York, announces that Asbeck, Osthaus, Eicken & Co., Hagen, Germany, have placed in his hands the sole agency for the United States and Canada for their Steel Music Wire for pianofortes and springs. This Wire is referred to as well known for its superior quality. Mr. Boker states that he keeps a large stock on hand for springs, which is especially manufactured for this purpose. His circular also states the sizes in which Wire is made.

The American Screw Company, Providence, R. I., send out in very neat form a sample of their new rolled Screw. One of the new Screws and one of the old are inserted in wood, which is cut open to show the manner in which the two Screws enter the wood. They call attention to the superior point of the new Screw, which enters the wood easily, to its deep thread, giving greater holding strength, and to the small shank, which avoids splitting the wood, and requires but one boring for hard wood.

As appears by the advertisement on page 69, it will be seen that Wm. H. Caldwell is successor to the Andrus Mfg. Company, Rochester, N. Y. In carrying on the manufacture of the interesting Hardware specialties formerly made by that company Mr. Caldwell will have the best wishes of the trade for his success.

Walter Hart, 65 Stone street, New York, issues a circular devoted to the National Flagstaff Bracket, which shows the separate parts and the use of the Bracket. By the announcement on page 49 it will be seen that Mr. Hart calls attention to these Brackets, and his desire to make arrangements with houses in the principal cities to handle the goods.

An interesting game of base-ball took place at the Prospect Park base-ball grounds last Saturday between the employees of Wm. Bryce & Co. and H. L. Judd & Co. The game was well played by both clubs. The result was the latter were vanquished, the score being Wm. Bryce & Co., 7; H. L. Judd & Co., 6.

W. B. Barry Saw and Supply Company, Indianapolis, Ind., have issued their catalogue and price list for the current year. It is a conveniently arranged pamphlet, which represents their line of goods, with mention of related specialties and tables for reference. The company call attention to the fact that some important changes have been made in prices, and that some valuable additions have been made in the line of Saw Tools.

E. K. Sargeant, Brockville, Ont., issues a circular relating to Sargeant's Process Coffee Pot and Urn, which was patented in Canada March 31, 1886, and in the United States May 1, 1888. Besides the ordinary line of Coffee Pots made on this principle the circular describes large Coffee Machines for making from 11 to 20 gallons at a time.

Worcester Ferrule Company, Worcester, Mass., have obtained a patent for improvements in Knobs for dampers or registers, the object of the invention being to produce a Knob which will cause the slide to which the Knob is attached to fit more closely to the door. This is accomplished by means of a coiled spring bearing at its opposite ends against the nut and the inner face of the cap plate.

The Cincinnati Wire Company, Cincinnati, Ohio, have issued their standard price list No. 2, which contains the card for Standard Wire Nails, and also the Miscellaneous Wire Nail list, with the memoranda of extras which we referred to in our last issue as decided upon by the manu-

facturers. The whole is conveniently arranged, and will be appreciated by the trade. In the circular accompanying it the company call attention to the fact that their factory is equipped with the most modern machinery, and manned by the best class of nailers, and has a capacity of 600 kegs per day.

The Henry C. Hart Mfg. Company, Detroit, Mich., have issued a catalogue of specialties for the Toy trade. It includes Safes, Savings Banks, Toy Cannon, &c. The Cash Register Bank is an interesting and recent addition. It has a device for registering the amount of cash contained in the Bank.

On the 2d inst. the partnership heretofore existing between F. D. Butterfield and H. S. Haskell, under the name of Butterfield & Co., Derby Line, Vt., was dissolved by mutual consent. The manufacture of Stocks, Dies and Taps for blacksmiths', machinists' and steam fitters' use will be continued by F. D. Butterfield and F. G. Butterfield under the same style as heretofore, they having succeeded to the business of the late firm.

### Trade Topics.

With reference to uniformity in marking goods, as advocated in the letter of a correspondent in a recent issue, we have the following from a Missouri Hardwareman:

I noticed an article in your paper on uniformity in marking goods, which seems to me looks well on paper. It is, however, mighty hard to lay down a cast-iron rule to sell by. No doubt your correspondent has reference to running the business in a city of some size, where a cash trade is possible. But what rule would he advocate for the country merchant who not only does not sell for cash, but all the way from one to six months' time, or longer? Now if we make a cast-iron rule and charge our cash customer the price marked on the goods, what shall we do with those who settle up twice or three times a year? It will not do to charge them a little more on every article that we sell, for they would object. How is this to be regulated? Or if we were to increase the margin, so as to take in our six months' customer, would that be doing justice to the man who paid us in 15 or 30 days? Or, supposing a customer comes in who sometimes pays cash and at other times does not and asks for a certain article, and, expecting him to pay the cash, we name the cash price to him; he takes it and walks out without saying any thing about paying for it. So, of course, it must be charged. The same day or a few days later another credit customer comes in and asks for the same article and we ask him the regular credit price charged him. As our trading is nearly entirely with farmers who come to town on a rainy day, and will spend nearly all the day in town talking about tariff, crops, &c., it often happens that farmer No. 1 will meet farmer No. 2 on the street: "Buy a Fork?" "Yes." "How much?" "50 cents." "50 cents! Why I only paid 45 cents for mine." That settles No. 2 and he is going to have revenge, either by raising a racket or by stopping buying from a man who charges him more than he does his neighbor. I trust your correspondent will give us a little more light on this subject, as it is a very interesting one, and oblige A COUNTRY DEALER.

Referring to the combination between the foreign manufacturers of Screws, which we announced in our last issue, the London Ironmonger, July 7, remarks editorially:

The condition of the Screw trade for a long time past had been exceedingly unsatisfactory to the firms engaged in it, and the keenness of competition had led to such constant cutting of prices that profits were in many instances re-

duced to such fine proportions that the business was not worth having. In the end, this state of things has led to the arrangement under which the various leading markets are carefully apportioned, and prices are regulated so as to yield the makers what they consider a proper return for their capital and skill. The British home trade, naturally enough, is left exclusively to Nettlefold's, while the German home market is to be supplied exclusively by German makers. The French market naturally falls chiefly to the share of Japy Frères. As to Belgium, Switzerland, Scandinavia, Russia, Austria and the East of Europe, Italy, Turkey, Spain and Portugal, we are without definite information at the moment, but it is understood that the whole of these markets have been "arranged" in a manner which will be satisfactory to all parties concerned. All other markets—that is to say, all countries outside Europe—are, it is stated, to be supplied at a present discount of 72½ per cent. off Nettlefold's list, and it is understood that this part of the business is to be done on the principle known in America as "pooling." What the immediate effect of the arrangement upon prices will be we cannot state until the new lists or revised discounts are made known, but it is stated that net prices will be advanced by nearly 60 per cent. Of this, however, we have not definite information, and merely repeat what is stated by those who assert that they have knowledge to that effect. If that is the case, then it cannot be said that the new "arrangement" errs on the side of modesty, but exacts a very considerable penalty from consumers for the benefits they have derived from the competition of recent years. Whether the combination, as a whole, is wise from a British point of view we are scarcely in a position to state from the rather scanty details in our possession. On the face of it, however, it appears as though Nettlefold's had surrendered the foreign markets, or some of them, rather lightly, yet we are bound to assume that the managers of that concern have paid due regard to the "British interests" involved, and have not made concessions to their foreign competitors (friends now, we suppose) without obtaining equivalent advantages in other directions.

### The James L. Haven Company,

Cincinnati, Ohio, issue a sheet containing the following net prices to dealers on Sorghum Mills, Evaporators, Corn Crushers, Shellers, &c. The implements and machinery referred to in this price list are described and illustrated in other pamphlets:

#### The Economist Cane Mill.

No. 0, Steel shafts, 2 rolls. Capacity, 50 gallons per hour; weight 365 lbs. Price, \$17.50

#### The Pioneer Cane Mills.

Wrought steel shafts, turned bearings, gearing cast separate from the rolls and bored, rolls turned, brass boxes, feed boxes and patent step preventing clogging.

No. 00. Capacity, 50 gallons per hour. Weight, 350 lbs. Price, \$20.00

No. 1. Capacity, 50 gallons per hour. Weight, 550 lbs. Price, \$27.50

No. 2. Capacity, 100 gallons per hour. Weight, 750 lbs. Price, \$36.00

No. 3. Capacity, 134 gallons per hour. Weight, 1000 lbs. Price, \$45.00

#### New South Cane Mills.

Steel shafts, flanged rolls, separate gear, brass boxes.

No. A. Light one-horse. Estimated capacity, 40 to 60 gal. per hour. Weight, 450 lbs. Price, \$30.00

No. B. Regular one-horse. Estimated capacity, 60 to 75 gal. per hour. Weight, 600 lbs. Price, \$27.50

No. C. Heavy one-horse. Estimated capacity, 75 to 90 gal. per hour. Weight, 725 lbs. Price, \$35.00

No. D. Regular two-horse. Estimated capacity, 90 to 100 gal. per hour. Weight, 1100 lbs. Price, \$45.00

#### Champion Horizontal Cane Mills.

Letter A. One-horse. Approximate weight, 600 lbs. Capacity per hour, 60 gals. Price, \$27.50

Letter B. One or two horse. Approximate weight, 700 lbs. Capacity per hour, 75 gals. Price, \$35.00

Letter C. Two-horse. Approximate weight, 900 lbs. Capacity per hour, 100 gals. Price, \$42.50

Cook's Patent Combined Portable Evaporators.

Including Pan, two Skimmers, Rocker Furnace, Grate and Chimney.

Size of pan. Syrup per day. Acres cane per season.

No. 2....44 x 72 in. 30 to 40 gals. 6 to 8

No. 3....44 x 90 in. 40 to 60 gals. 8 to 12

No. 4....44 x 108 in. 50 to 80 gals. 12 to 48

No. 5....44 x 126 in. 70 to 100 gals. 20 to 30

With galv. iron pan. Approx. weight. With heavy copper pan. Approx. weight.

No. 2....\$17.50 250 lbs. \$42.50 275 lbs.

No. 3....21.00 275 lbs. 50.00 300 lbs.

No. 4....24.50 300 lbs. 60.00 350 lbs.

No. 5....29.75 350 lbs. 75.00 400 lbs.

With these Evaporators the following sizes of Mills can be used, but we recommend a Pan one size larger:

With No. 2, No. 0 Economist, A Western.

With No. 4, No. 1 Pioneer, B Western.

With No. 3, No. 00 Pioneer, A Champion.

With No. 5, B Champion, C Western.

Get an Evaporator large enough.

Cook's Patent Pans for Brick Furnaces.

Galvanized iron or copper, with two skimmers complete.

Size of pan. Syrup per day. For acres.

No. 2....44 x 72 in. 30 to 40 gals. 6 to 8

No. 3....44 x 90 in. 40 to 60 gals. 8 to 12

No. 4....44 x 108 in. 50 to 80 gals. 12 to 18

No. 5....44 x 126 in. 70 to 120 gals. 15 to 30

No. 6....44 x 144 in. 100 to 140 gals. 20 to 35

No. 7....44 x 180 in. 125 to 175 gals. 30 to 45

Approx. weight. Galv. iron. Heavy copper.

No. 2....100 lbs. \$8.75 \$30.00

No. 3....125 lbs. 10.50 37.50

No. 4....150 lbs. 12.25 42.50

No. 5....165 lbs. 15.75 55.00

No. 6....180 lbs. 19.25 65.00

No. 7....230 lbs. 22.75 75.00

With these Pans the following sizes of Mills can be used, but we advise a Pan one size larger.

It is poor economy to use too small a Pan.

With No. 2, No. 0 Economist, A Western.

With No. 3, No. 0 Pioneer, A Champion.

With No. 4, No. 1 Pioneer, B Western.

With No. 5, B Champion, C Western.

With No. 6, No. 2 Pioneer, C Champion, D Western.

With No. 7, No. 3 Pioneer.

Cook's Patent Furnace, with Grate and Chimney.

(No Pan.)

No. 2. For Pan, 44 x 72 in. Weight. Price.

No. 3. For Pan, 44 x 90 in. 200 lbs. \$10.00

No. 4. For Pan, 44 x 108 in. 215 lbs. 12.00

No. 5. For Pan, 44 x 126 in. 225 lbs. 14.00

No. 6. For Pan, 44 x 144 in. 250 lbs. 16.00

Furnace Doors and Grate Bars.

To be used with Evaporator Pans for Brick Furnaces.

No. 1 Furnace Door, 16 x 18 in. Price, \$3.00

No. 4 Grate, 18 x 33 in. Price, 1.50

Haven's IXL Cider Mills.

With Double Cranks.

Senior, with double cranks and adjustable feed rollers. Price, \$18.00

Medium, with one crank and adjustable feed rollers. Price, 15.00

Junior, with one crank and adjustable feed rollers. Price, 11.50

Haven's IXL Power Cider Mills.

No. 1. Rollers 10½ in. long by 8 in. diam. Capacity, 100 to 200 bushels per hour. Price, \$60.00

No. 2. Rollers 14 in. long by 12 in. diam. Capacity, 200 to 400 bushels per hour. Price, 100.00

Cider-Press Screws—Cast.

For Hand or Power Mills.

5 ft. long, 4 in. diam. Price, each, \$11.00

Little Giant Corn Crushers.

Complete, with Box, Hopper and Sweep.

No. 1. 2-cone, 1-horse, 5 to 8 bushels per hour. Price, \$18.00

No. 2. 2-cone, light 2-horse, 7 to 10 bushels per hour. Price, 22.00

No. 2. 3-cone, 2-horse, 8 to 12 bushels per hour. Price, 29.70

No. 3. 3-cone, 3-horse, 12 to 20 bushels per hour. Price, 37.80

This is the old and favorite pattern of Little Giant, of which more have probably been sold than of all other styles combined.

Excelsior Feed Mill.

Force Feed and White Iron Grinders. Complete with Box, Hopper and Sweep.

No. 4. Estimated capacity, 5 to 15 bushels of meal per hour, according to fineness ground. Weight, 425 lbs. Price, \$24.30

Warranted to be well made of good material, and to work well when properly managed.

Haven's IXL Corn Shellers.

Single, with Separator. Price, \$5.50

Single, with Separator and Fan. Price, 6.00

Extra for Hopper or Feed Table. Price, .50

Double, with Separator, Fan, Feed Table, Crank and Pulley for power. Price, \$13.00

Eagle Corn Shellers.

Single, with Separator. Price, \$6.00

Single, with Separator and Fan. Price, 6.75

Extra for Hopper or Feed Table. Price, .50

Double, with Separator, Fan, Feed Table, Crank and Pulley for power. Price, \$14.00

Horse Powers.

Light, with two Levers and Tumbling Shaft and Pulley. Price, \$28.00

Heavy, with two Levers and Tumbling Shaft and Pulley. Price, \$45.00

Heavy, with four Levers and Tumbling Shaft and Pulley. Price, \$48.00

Road Scrapers.

No. 2, 26 in. wide; weight, 90 lb. Price, \$3.50

No. 3, 29 in. wide; weight, 100 lb. Price, 4.00



**Sanford's Patent IXL Perfect Cutting Boxes,**  
For Hay and Straw.

No. 1, with 40 knives. Weight, 150 lbs. Price, each.....\$6.75  
 No. 2, with 40 knives. Weight, 100 lbs. Price, each.....5.00  
 No. 3, with 30 knives. Weight, 60 lbs. Price, each.....4.00

**Haven's IXL Lever Cutting Boxes.**

No. 9, 10-inch curved knife. Weight, 45 lbs. Price, each.....\$3.60  
 No. 4, 11-inch curved knife. Weight, 55 lbs. Price, each.....4.50  
 No. 3, 11-inch straight knife. Weight, 55 lbs. Price, each.....3.60

**The Eagle Hand Cutters.**

No. 9. One 8-in. knife, self-feed, geared 4 to 1, cuts  $\frac{1}{2}$  or  $\frac{3}{4}$  in. hay or straw, weight, 100 lbs.....Price, \$8.70  
 No. 8. For hay, straw or fodder, 8-in. knife, cuts  $\frac{3}{4}$  to  $1\frac{1}{4}$  in., stop-feed, weight, 150 lbs. Price, 11.40  
 No. 11. For hay, straw or fodder, 11-in. knife, cuts  $\frac{3}{4}$  to  $1\frac{1}{4}$  in., stop-feed, weight, 150 lbs.....Price, 13.20

**Eagle Power Cutters—Three Sizes.**

No. 13. Two 13-in. knives, cuts  $\frac{3}{4}$  to  $3\frac{1}{4}$  in., stop-feed, safety fly-wheel, will cut two to three tons green fodder per hour.....Price, \$24.00  
 No. 15. Two 15-in. knives, cuts  $\frac{3}{4}$  to  $3\frac{1}{4}$  in., stop-feed, safety fly-wheel, will cut three to four tons green fodder per hour.....Price, 27.00  
 No. 20. Four-feed or ensilage, two 20-in. knives, cuts  $\frac{3}{4}$  to  $3\frac{1}{4}$  in., stop-feed, safety fly-wheel, capacity, eight to ten tons per hour.....Price, 45.00

**Lawn Vases.****Painted White, or Green and Bronze.****Berlin Vase and Base, No. 7.**

Height of Vase and base, 33 in.....Price, \$9.00  
 Height of Vase alone, 21 in.....Price, 5.05

**Grosvenor Vase and Base.**

Price.  
 No. 1. Height of Vase and base, 42 in.....\$12.15  
 No. 1. Height of Vase alone, 28 in.....9.00  
 No. 3. Height of Vase and base, 36 in.....9.00  
 No. 3. Height of Vase alone, 24 in.....5.85  
 No. 5. Height of Vase and base, 31 in.....5.85  
 No. 5. Height of Vase alone, 22 in.....4.05

**Avon Vase and Base, No. 4.**

Height of Vase and base, 29 in.....Price, \$5.85  
 Height of Vase alone, 17 in.....Price, 4.05

**Woodberry Vase and Base, No. 2.**

Height of Vase and base, 40 in.....Price, \$11.70  
 Height of Vase alone, 20 in.....Price, 8.55

**Fernleaf Vase and Base, No. 1.**

Height of Vase and base, 32 in.....Price, \$8.10  
 Height of Vase alone, 24 in.....Price, 6.30

**Fernleaf Vase and Base, No. 2.**

Height of Vase and base, 32 in.....Price, \$7.65  
 Height of Vase alone, 24 in.....Price, 5.85

**Painted White or Green and Bronze to order.****Fernleaf Vase and Base, No. 3.**

Height of Vase and base, 33 in.....Price, \$7.20  
 Height of Vase alone, 25 in.....Price, 5.40

**Fernleaf Vase and Base, No. 4.**

Height of Vase and base, 22 in.....Price, \$5.85  
 Height of Vase alone, 14 in.....Price, 4.05

**Lawn Settees.****Rustic Settee.**

No. 1, will seat two persons.....Price, \$6.75  
 No. 2, will seat three persons.....Price, 8.10

**Grape Settee.**

No. 3, will seat two persons.....Price, \$8.10  
 No. 4, will seat three persons.....Price, 9.45

**Wood Slat Settees.**

No. 1, Wood Slats, Iron Legs, 4 ft. 8 in. long. Price, \$4.50  
 No. 2, Wood Slats, Iron Legs, 5 ft. long. Price, \$4.95

**Lawn Chairs.****Lattice Chair.**

No. 1, painted White, or any color to order. Price, \$3.60

**Morning Glory Chair.**

No. 2, painted White, or any color to order. Price, \$4.95

**Export Trade.**

In the existing condition of domestic business, in which in many lines there is a capacity of production beyond the requirements of the trade, manufacturers are giving increased attention to export trade, and it is gratifying to observe that American Hardware is going in enlarged quantities and in greater variety of goods to foreign markets. As indicating something of the extent of our export business and the class of goods that are going abroad, we give the following detailed statement of shipments in the Hardware and related lines that have recently been made:

PER BARK ABIEL ABBOTT, FOR BRISBANE, QUEENSLAND.

By Arkell & Douglas, New York.—700 dozen Handles, 100 dozen Shovels, 50 dozen Picks, 40 dozen Axes, 350 dozen Handles, 22 Lawn Mowers, 20 dozen

Shovels, 10 dozen Spades, 12 dozen Rakes, 50 dozen Handles, 1 gross of Egg Beaters, 1 dozen Saws, 12 dozen Lanterns, 2½ dozen Choppers, 20 dozen Shovels, 1½ gross Axle Grease, 10 dozen Pulleys, 335 pounds of Nails, 1 case of Hardware, 2 dozen Hay Knives, 10 dozen Saws, 224 pounds Oil Stone, 2 dozen Braces, ½ dozen Sieves, 3 Bracket Saws, 5 packages of Hardware, 3 dozen Traps, 50 dozen Handles, ½ dozen Scales, 36 dozen Butts, 7 dozen Planes, 5½ dozen Choppers, 6 dozen Saws, 7 packages of Hardware, 13½ dozen Axes, 1 dozen Grindstones, 3 dozen Hand Screws, 1750 pounds of Axles, 6236 pounds of Castings.

By V. Basanta, New York.—50 dozen Shovels, 21 Churns, 6 dozen Manure Forks, 7½ gross Fruit Jars, 3½ dozen Plated Ware, 12 dozen Hay Forks, 4 dozen Wrenches, 12 dozen Liquid Glue, 5½ gross of Locks, 1 gross of Gate Hinges, 6 dozen Twine Boxes, 2 dozen Money Drawers, 6 dozen Plumbs and Levels, 225 dozen Saws.

By Reed & Barton.—3 packages of Plated Ware.

By H. W. Peabody & Co.—600 dozen Handles, 39 dozen Blocks, 87 dozen Hay Forks, 1 case of Hardware, 3 Mowers.

**BARK TILLIE BAKER TO MELBOURNE.**

By R. W. Cameron & Co.—40 dozen Tools, 2 cases Sandpaper, 13 cases Castings, 1145 pounds of Bolts, 2 cases Carpet Sweepers, 1 case Hardware, 6 cases Forks, 3 cases Axles, 30 kegs of Nails, 6 boxes Hinges, 3 boxes Hammers, 1 box Castings, 9 cases Hubs, 10 cases Axles, 25 cases Roofing Slates, 1 case Fire Arms, 10 cases Axes.

By McLean Bros. & Rigg.—12 dozen Blacking Brushes, 5 dozen Apple Parers, 3 cases Electrical Apparatus, 3 gross Can Openers, 4 dozen Twin Screws, 36 Scales, 18 Jacks, 1 dozen Hog Rings, 2 dozen Grindstones, 4 dozen Hammers, 1 case Door Springs, ½ dozen Drills, 1 case Primers, 6700 pounds of Nails, 1036 pounds of Nails, 1900 pounds of Rivets, 110 dozen Axes, 8½ gross Axle Grease.

By Simpson, Hall, Miller & Co.—950 pounds Plated Ware.

By W. K. Freeman.—3 cases Plated Ware.

By Morris, Strouse & Co.—3 packages Roller Skates.

By R. W. Forbes & Son.—72 dozen Gate Hinges, 8 cases Hardware, 1181 pounds of Wire Netting, 20 packages Hardware, 500 pounds Stone, 865 pounds Carriage Bolts, 110 sets of Axles, 2 packages Hardware, 17 packages Carriage Woodwork, 22 packages Hardware, 12 dozen Oilers, 6 dozen hammers, 14 packages Hardware, 3 packages of Pumps, 18 dozen Hatchets, 75 kegs Nails, 153 packages Carriage Woodwork.

By Healy & Earl.—1 box Dies and Rings, 16 cases Grain Mills, 4 cases Grain Mills, 1 box Wrenches, 2 cases Sandpaper, 1 case Emery-Wheels.

By Arkell & Douglas.—9 dozen Saws, 113 pairs Roller Skates, 5380 pounds of Bolts, 4 cases Hooks, 13 dozen Saws, 1½ dozen Choppers, 9 dozen Forks, 9 dozen Axes, 36 dozen Handles, 6 dozen Hammers, 1½ dozen Churns, 2 gross Wall Hooks, 3 dozen Sifters, 15 dozen Axes, 3 dozen Axes, 3935 pounds of Bolts, 16 dozen Saws, 1½ dozen Wringers, 24 dozen Hatchets, ½ dozen Guns, 67 pounds Tacks, 1 case Wall Hooks, 6 dozen Gate Hinges, 1 dozen Banks, 3 dozen Toys, 140 dozen Handles, 10 dozen Axes.

By Meriden Britannia Company.—7 packages Plated Ware, 2 boxes Plated Ware, 17 packages Plated Ware, 25 packages Plated Ware, 2 boxes Plated Ware, 5 boxes Plated Ware.

By Russell & Erwin Mfg. Company.—28 cases Hardware.

By Hammacher & Delius.—42 packages Hardware.

By C. Walker.—1 box Harrows.

By W. H. Crossman & Bro.—684 dozen Handles.

By Martland, Phelps & Co.—19 gross Swivel Snaps.

By H. W. Peabody & Co.—27 cases Mowers, 1983 pounds of Axle Grease, 6198 pounds Barb Wire, 30,682 pounds Barb Wire, 1 Refrigerator.

By Coombs, Crosby & Eddy.—15 dozen Hay Forks, 24 dozen Axes, 1 dozen Scales, 200 dozen Carpenters' Tools, 12 cases Axle Grease, 30 Wringers, 80 dozen Carpenters' Tools.

By Peck, Store & Wilcox Company.—13 boxes Tinsmiths' Tools.

By Page, Dennis & Co.—3 Refrigerators, 1 box Hardware, 1 package Trucks.

By Reed & Barton.—7 packages Plated Ware.

By Rogers, Smith & Co.—7 packages Plated Ware.

**Arrangement of Stores.**

McGibbon & Tarbox, Hancock, N. Y., furnish us material for description of Cross-cut Saw Case, which is shown in Fig. 254, which is referred to by them as exceedingly convenient and economizing space very satisfactorily. Saws are inserted top first

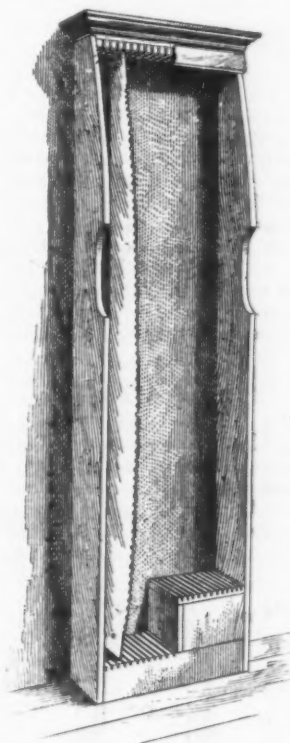


Fig. 254.—Cross-Cut Saw Case.

into slots back of the top board, part of which is shown broken away to indicate the construction. They are thus kept from falling forward, and are easily and quickly removed as desired. The Case, as shown, accommodates 12 each 6-foot and 5½-foot Cross-cuts, and it is obvious that the same principle can be further applied for the accommodation of other sizes. The side pieces are made of wood  $\frac{1}{4}$  inch thick and 7 inches wide. Their width at the top is 4 inches. The Rack stands against the wall.

The Paddock-Hawley Iron Company, of St. Louis, write us that they are informed that John Zamarana, a young Mexican formerly in their employ, has been using their name as reference without any authority from them.

### Gillingham's Self-Sealing Cans.

The illustration given below represents these cans, which are made by the Postal Package Company, 34 South Paca street, Baltimore, Md. They are made in leading sizes from 2 x 2 to 4 x 7 inches. As indicated in the cut, the cans and tops are



*Gillingham's Self-Sealing Cans.*

threaded so as to give a simple and effective cover, which can be easily and quickly opened or closed. In the top of each cover there is an oil-proof washer that rests on the flange of the can, rendering the can, it is claimed, perfectly tight. The special advantage claimed for these cans is that they require no cement, solder or tools, and that as they are not destroyed in opening they will last for years. The company advise us that in addition to the demand for this article by families and other consumers dealers in paints are buying paints, &c., in bulk and putting them in cans with their own label, giving them an extra profit, which they could not make before, as they had no facilities for soldering on the top of the old style cans.

### Improved Staples.

The Wire Goods Company, Worcester, Mass., are putting on the market a line of improved Wrought Staples, which, they advise us, is now complete. One of them is represented in the illustration given below. The special feature of these



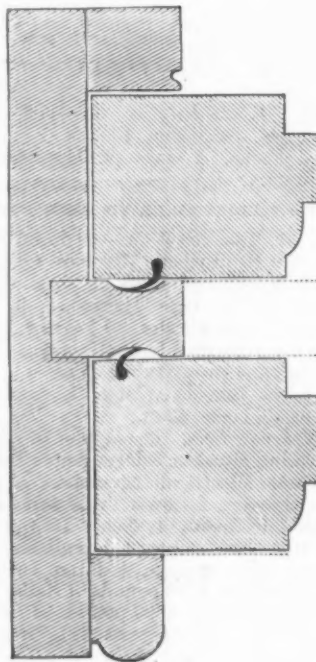
*Improved Wrought Staples.*

goods, which are patented, is that the arms of the staples are the same size all the way down, so that they hold, it is claimed, with the well-known tenacity of a wire nail. It is pointed out by the company that hand-forged staples, or rolled or sheared staples, taper from the point to the limit of the part that goes into the wood, so that the staple rests in a tapering

socket. Hence, it is claimed, it is necessary to clinch the ordinary staple. With this staple the point is made that no clinching is required, the staples holding with sufficient tenacity without it. For this reason it is intimated that a much smaller size of staple will answer the purpose of a larger staple of the ordinary kind. It is further stated that staples made by this process are very uniform in size, and of unusually neat appearance. The company are now ready to supply all sizes, and put them on the market as wrought staples only, and also packed in the various forms of hook and staple, ring and staple, &c.

### Weather-Proof Window.

G. W. Everett, No. 11 East Tenth street, New York, is directing attention to a weather-proof window which he is in-



*Fig. 1.—Horizontal Section Through Window Frame, Showing Application of Everett's Weather Proofing.*

troducing. Fig. 1 of the engravings represents a horizontal section through the window frame, showing the inside and outside stops, parting strip and the sash. It will be noticed the special feature of improvement is a section of rubber introduced into the sash, for the reception of which a segmental groove is cut in the parting strip. The effect of this construc-

tion is to cause the rubber, by its elasticity, to spring outwardly against the parting strip, making the construction wind-tight. Fig. 2 of the engravings is supposed to represent a vertical section through the meeting rail of the window. The same feature, it will be noticed, is applied to the upper sash, with the exception that there is not the corresponding groove for receiving the rubber. The wedging of the rubber strip between the two parts of the meeting rail makes a wind-tight joint

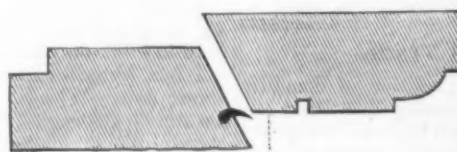
### The Picnic Lamp-Stove.

M. L. Hull, of Cleveland, Ohio, is offering the trade a neat gasoline lamp-stove, which he designates as the Picnic,



*The Picnic Lamp Stove.*

an illustration of which is shown in the accompanying engraving. This stove is designed to occupy a place not filled by anything at present on the market, and is adapted for light housekeeping, picnics, camping parties, &c. It is simple of construction, well made in all its parts and weighs only 3½ pounds. The grate to hold cooking vessels is made of sheet steel: the burner has but one valve, and the tank has a capacity for sufficient gasoline to keep the stove in operation for 5 or 6 hours. The manufacturer states that the wooden handle to the needle valve is of recent invention, and permits shortening the valve rod without burning the hand. The construction of the stove is such that a drum may be placed above the burner, transforming it into a convenient heating stove. The pressure is easily regulated by an ingenious device in the filler screw. The stove is also adapted for use as a sad-iron heater. The claim is made that it can be placed upon the ironing-board or table where it is convenient to the operator and thus does away with the necessity of keeping a hot coal fire during the summer months. The stove



*Fig. 2.—Vertical Section Through Meeting Rail with Everett's Improvement.*

is light yet strong, and capable of sustaining any cooking vessel it may be desired to use.

The Bank of America has just filed plans in the Building Department for the erection of a superb eight-story building at Nos. 44 and 46 Wall street, to cost \$400,000. The building will have a frontage of 69 feet and be 80 feet deep. The front will be of granite and limestone.



**Solid Link Chain.**

A novelty in chains adapted for various uses is being introduced by the Solid Link Chain Mfg. Company, No. 51 John street, New York. One form of the chain is



Fig. 1.—Solid Link Chain for Window Sash, &c.

shown in Fig. 1, and is approximately full size. It is that form which is adapted to be used for sash weights, with sash of medium to large size. Fig. 2 of the engravings shows how it is to be applied. The chain is also adapted for many other uses, among which may be mentioned belting and chains for ornamental purposes. When used for sash weights, it has the advantage of being very nearly of the same section as the ordinary cord used for the purpose. In other words, it is very nearly round, and is not liable to be damaged by twisting. As indicated by the name, it is composed of solid links, and is the product of some very ingenious machinery. The chains of this general class have been commonly constructed so that the cross portion in each link between the bends which connect it with the loops of the link, is curved in a direction opposite to the direction in which the loops are presented. The consequence is that when strain is applied to the chain the loops of each link have a tendency to draw and come together at the middle of the cross portion of the link which they embrace, thus impairing the flexibility of the chain. It is claimed that the chain here shown overcomes this difficulty entirely. The links, in order to



Fig. 2.—Sash and Weight Connected With Solid Link Chain.

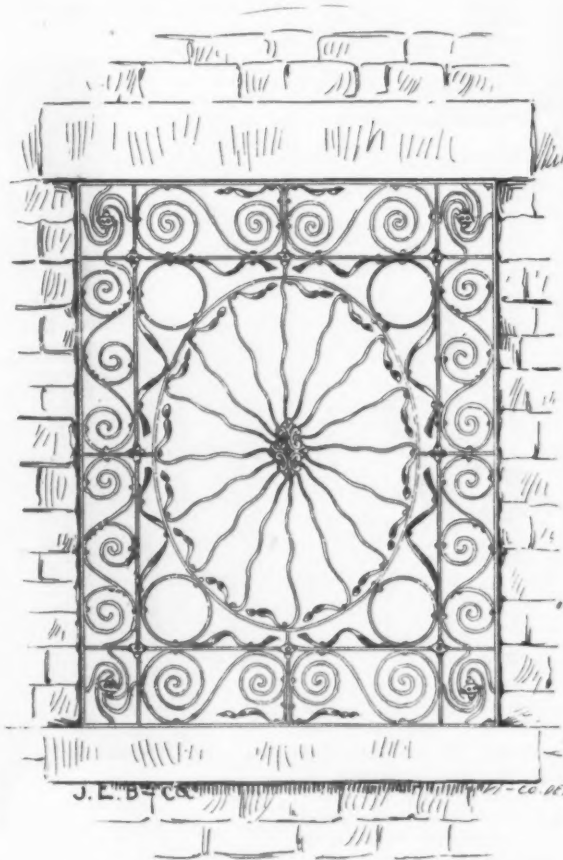
simulate the appearance of wire, are stamped from flattened wire, thus securing round edges. The chain is manufactured in several different forms, as well as in the cable shape here illustrated.

The Kentucky Wagon Mfg. Company, W. C. Nones, manager, manufacturers of the Old Hickory wagons, will soon move

into their new works, which are erected at South Louisville, a suburb of Louisville, Ky., and are built on a very large scale. They have bought the good-will, trademark and works of the Tennessee Wagon Works, operated by Cheny, Morrow & Co.,

inside the penitentiary of Nashville, Tenn. The latter parties will retire from the business at the expiration of their lease of the convicts, January 1st, 1890, and both members of the firm will be stockholders in the mammoth new factory at Louisville. The two brands of wagons made will be

well for light pressures. The difficulty with the use of this type of pipe or turbine was that when the pipe became old and weakened by decay it was liable to accidents, especially those caused, whenever the gates were closed quickly, by the impact of the energy of the water flowing through the wheel. The present water supply of Tokio, Japan, is by the wooden water-pipe system, which has been in existence over 200 years, furnishing at present a daily supply of from 25,000,000 to 30,000,000 gallons. There are several types of water-pipes in use, the principal class being built up with plank, square, and secured together by frames surrounding them at close intervals. The pipes, less than 6 inches, consist of bored logs, and somewhat larger ones are made by placing a cap on the top of a log in which a very large groove has been cut. All the connections are made by chamfered joints,



Window Guard, Manufactured by J. E. Bolles & Co., Detroit, Mich.

the Old Hickory and Tennessee, and the new works are being built with capacity to increase the output of both, which aggregated last year over 30,000 farm wagons. The Kentucky Wagon Mfg. Company will be operated by free labor entirely, giving Louisville's skilled workmen a larger field.

**Wood Water-Pipes.**—All of the earlier water-works in America used mains of wood constructed out of what is known as pump logs, or timber bored from end to end by means of a pump auger, and pointed at one end so as to fit into the countersink at the end of the next log, the space between the two being caulked with oakum. It is known that these pump logs have certainly lasted nearly a century in some locations, although they are of course not to be compared with cast-iron pipes used for such purposes. In some portions of the western part of the United States they are using large water mains built of staves, made up similarly to a wooden trunk sometimes used to furnish a supply of water to turbines, and it is found that they answer their purpose very

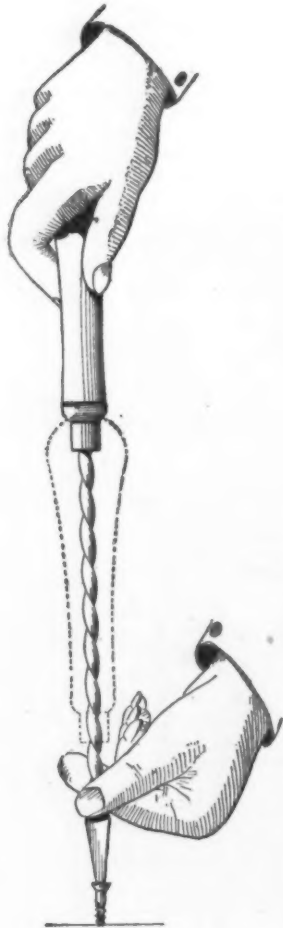
and cracks are caulked with an inner fibrous bark. Square boxes are used in various places to regulate the uniformity of the flow of the water, which is rather rapid, for the purpose of preventing aquatic growth. The water is not delivered to the houses, but into reservoirs on the sides of the streets, nearly 15,000 in number.

**Iron Window Guard.**

Every year shows more and more taste displayed in design as well as in features of construction of wrought-iron work. Not only do the architects vie with each other in producing appropriate designs in work of this class for use in various places, but manufacturers as well give special attention to forms in which their material may be worked to produce graceful effects, while at the same time accomplishing the special objects in view. The accompanying design represents a window guard recently brought out by J. E. Bolles & Co., of Detroit, Mich. The parts are clearly defined and the work speaks for itself.

### Automatic Screw-Driver.

The Shaver Corporation, No. 157 Broadway, New York, are introducing what is known as Shaver's Automatic Screw-Driver, an illustration of which is presented in the annexed engraving. The screw-



Shaver's Automatic Screw-Driver.

driver is of the spiral variety, the shank being twisted and working through proper mechanism in the ferrule of the handle, as shown. It differs in various details of construction from other spiral screw-drivers which we have illustrated in the past, and is of a size and character to be very useful for both amateurs and mechanics. The handle itself, which in the sample before us is made of hard wood, measures 9 inches in length. When the screw-driver is extended the total length is 17 inches. The handle where the hand would grasp it is nearly 2 inches in diameter, dimensions which constitute it of more interest to mechanics than is usual with tools of this class. Another advantage is its lightness. The cut shows the method of holding the tool at the beginning of the stroke, the dotted line showing the position of the handle at the end of each stroke. The makers mention that the screw may be driven with this tool without any hole being prepared for the screw, the driver being so powerful that the screw, including the countersink, can be forced into soft wood without difficulty. The whole operation for driving an ordinary screw is accomplished by three straight thrusts of the hand, using, the makers assert, no more power at each thrust than is required by the ordinary method.

An agent of the Government of Mexico is visiting New York and Pittsburgh for the purpose of making contracts for a dozen light-houses for the Pacific Coast. A contract will probably be made for the

first two in America, and if terms are satisfactory as against the English, the balance will be made in this country also.

### Combined Bench and Tool Chest.

In the accompanying engraving we present a general view of a work-bench and tool-cabinet, being a novelty that has been introduced to the English trade by R. Melhuish & Son, of London, England. As it has many features of interest, we have believed our readers would be pleased with a description of it. It will be noticed that, in addition to the space afforded by the drawers, which occupy the principal portion of the front, a receptacle for tools is provided at either end, inside of swinging doors. In turn the lid is utilized, as is clearly shown in the cut, and only when it is raised is the work-bench brought into view. A vise for holding a board for working on the edge is shown, and also pins for supporting the opposite end of the work has thus been prepared, it is painted



Combination Tool Cabinet and Bench for Amateurs' Use.

board. According to the description which has reached us this article, as prepared for the English trade, is made of dark walnut, polished. The doors are finished with self-acting catches. The bench itself is composed of well-seasoned beech, and the drawers have polished brass handles and are divided and subdivided to hold screws, hooks and nails, and the large variety of articles that are required in connection with an outfit of this kind. The statement is made that the whole of the six drawers, two cupboards and top can be instantly closed and fastened with one small lock and key, thus leaving the cabinet in the shape of a very pleasing piece of furniture. There may be a suggestion in this cabinet which some of our readers will work out for their own use.

The Society of Civil Engineers lately in session in Milwaukee, Wis., propose to put up a fire-proof structure in New York for the preservation of the society's records. The estimated cost of the building is \$140,000, and the available fund \$30,000, leaving \$110,000 to be raised by subscription.

### Pa Crusta.

Pa Crusta is the name which has been adopted for a new mural and ceiling decoration that has been brought to public notice by the McDonnell-Mallen decorative Company, of Jacksonville, Ill. It is a rival of lincrusta walton and *papier maché* in its decorative effects, but is vastly different in its preparation and application, as well as its low cost. As far as it is possible to ascertain the new process consists in the application to a suitably prepared wall or ceiling of ordinary brown wrapping paper, moistened with a paste which causes it to adhere to the plaster, and at the same time enables it to be molded into various designs by the hand. No molds are employed for the production of set figures and patterns, but, on the contrary, an irregular appearance is intentionally sought by the originators of this method of decoration. After the ground work has thus been prepared, it is painted

in bronze, silver, or any other style of finish that may be desired. The ticket office of the Michigan Central Railroad, at the corner of Clark and Randolph streets, Chicago, is the first instance of the application of this method of decoration on a proper scale accessible to the public. In order to show its capabilities several styles of treatment have been here introduced, but without by any means exhausting the range, as other combinations continually suggest themselves to the artistic workman. It seems in a high degree unconventional, bold and striking in its originality. Those interested in the process claim that the application of this method of decoration is very simple, so that talented and therefore high-priced workmen are not absolutely essential to its successful arrangement. It is also very easily repaired if it is accidentally chipped, which is quite a favorable recommendation. It is the intention of the company to confine their work to dwelling houses and offices, avoiding saloons. In this way they claim a larger patronage will be assured among those who desire to see their houses look differently from drinking resorts.



# CURRENT HARDWARE PRICES.

JULY 18, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

## Ammunition.

Cape, Ferguson, 1000—	
Hicks & Goldmark's	
W. L. Waterproof, 1-10's	50¢
E. B. Trimmed Edge, 1-10's	dis 25¢
E. B. Ground Edge, Central Fire, 1-10's	75¢
Double Waterproof, 1-10's	dis 1.40
Musket Waterproof, 1-10's	dis 63¢
B. D.	dis 28¢
B. S.	dis 30¢
Union Metallic Cartridge Co.	
F. C. Trimmed	dis 50¢
F. L. Ground	dis 25¢
Can. Fire Ground	dis 75¢
Double Waterproof, in 1-10's	dis 1.40
A. B. Genuine Imported	dis 45¢
Eley's E. B.	dis 54¢
Eley's D Waterproof, Central Fire	dis 1.60

## Cartridges—

Rim Fire Cartridges	dis 50¢ & 2¢
Rim Fire Military	dis 15¢ & 2¢
Central Fire, Pistol and Rifle	dis 25¢ & 2¢
Central Fire, Military & Sporting	dis 15¢ & 2¢
Blank Cartridges, except 32 and 38 cal., an additional 10% over above discounts.	
Blank Cartridges 22 cal.	dis 1.75, dis 2¢
Blank Cartridges 32 cal.	dis 3.50, dis 2¢
Primed Shells and Bullets	dis 15¢ & 2¢
B. B. Cape, Round Ball	dis 1.75, dis 2¢
B. B. Cape, Conical Ball, Swaged	dis 35.00, dis 2¢

## Primers—

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	dis 1.00, dis 2¢
All other Primers, all sizes	dis 1.20, dis 2¢
First quality, 4, 8, 10 and 12 gauge, dis 25¢ & 10¢	
First quality, 14, 16 and 20 gauge (10 list)	dis 30¢ & 10¢
Star, Club, Rival and 10-gauge, 80 list	dis 38¢
Climax Brands, 12 gauge, 48 list	dis 21¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢ & 10¢
Seibold's Combination Shot Shells	dis 15¢ & 2¢
Brass Shot Shells, 1st quality	dis 60¢ & 2¢
Brass Shot Shells, Club, Rival and Climax	dis 65¢ & 2¢

## Shells Loaded—

List No. 19, 1887	dis 20¢ & 10¢
Wads—	
U. M. C. & W. R. A.—B. E., 11 up	dis 2.00
U. M. C. & W. R. A.—B. E., 9 & 10	dis 2.30
U. M. C. & W. R. A.—B. E., 7 & 8	dis 2.40
U. M. C. & W. R. A.—F. E., 11 up	dis 3.10
U. M. C. & W. R. A.—F. E., 9 & 10	dis 4.00
U. M. C. & W. R. A.—F. E., 7 & 8	dis 4.80
Eley's B. E., 11 up	dis 1.75
Eley's P. E., 11 & 20	dis 3.80

## Anvils—

Armstrong's Anvil	dis 10¢, dis 20¢ & 20¢
Peter Wright's	dis 94¢
Armstrong's Mouse Hole	dis 34¢
Armstrong's Mouse Hole, Extra	dis 11¢ & 11¢
Trenton	dis 84¢ & 9¢
Wilkinson's	dis 11¢ & 11¢
J. & Riley Carr Patent Solid	dis 11¢ & 11¢
Anti Vise and Drill—	
Millers Falls Co.	dis 18.00, dis 30¢
Cheney Anvil and Vise	dis 25¢
Allen Combined Anvil and Vise	dis 40¢ & 10¢
Moore & Barnes Mfg. Co.	dis 33¢ & 4¢

## Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	dis 70¢
Wm. A. Ives & Co.	dis 70¢
Humphreysville Mfg. Co.	dis 55¢
French, Swift & Co. (F. H. Beecher)	dis 55¢
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢ & 10¢
Ives' Circular Lip	dis 30¢
Patent Solid Head	dis 30¢
C. E. Jennings & Co., No. 10, extension lip	dis 40¢
C. E. Jennings & Co., No. 30	dis 60¢
C. E. Jennings & Co., Auger Bits, in square boxes	dis 20¢
Patent Single Twist	dis 20¢
Russell Jennings' Augers and Bits	dis 25¢
Imitation Jennings' Bits (new list)	dis 60¢ & 60¢
Pugh's Black	dis 20¢
Car Bits	dis 60¢ & 10¢
L'Hommedieu's Car Bits	dis 15¢ & 10¢
Forstner Pat. Auger Bits	dis 10¢

## Bits—

Ives' French, Swift & Co.	dis 25¢ & 10¢
Douglas	dis 25¢ & 10¢
Bonney's Adjustable	dis 40¢ & 10¢
Bonney's	dis 20¢ & 10¢
Ives' Expansive, each \$4.50	dis 60¢ & 10¢
Universal Expansive, each \$4.50	dis 20¢
Wood's	dis 25¢ & 25¢ & 10¢

## Expansive Bits—

Clark's small, \$15; large, \$30	dis 35¢ & 25¢
Ives' No. 4, per doz.	dis 35¢ & 40¢
Swan's	dis 40¢
Stearns' No. 1, \$35; No. 2, \$25	dis 25¢
Stearns' No. 2, \$45	dis 30¢

## Small Bits—

Common	dis 25¢ & 25¢
Diamond	dis 11.10, dis 25¢ & 10¢
"Bee"	dis 25¢ & 25¢
Double Cut, Sheardson's	dis 45¢ & 45¢
Double Cut, Ct. Valley Mfg. Co.	dis 30¢ & 10¢
Double Cut, Hartwell's, per doz.	dis 35.25
Double Cut, Douglas's	dis 40¢ & 10¢
Double Cut, Ives'	dis 60¢ & 60¢

## Bit Stock Drills—

Morse Twist Drills	dis 50¢ & 10¢
Standard	dis 50¢ & 10¢
Cleveland	dis 50¢ & 10¢
Syracuse, for metal	dis 50¢ & 10¢
Syracuse, for wood	dis 30¢ & 30¢
Williams' or Holt's, for metal	dis 50¢ & 10¢
Williams' or Holt's, for wood	dis 40¢ & 10¢

## Ship Augers and Bits—

L'Hommedieu's	dis 12¢ & 10¢
Watrous's	dis 15¢ & 10¢
Snell's	dis 15¢ & 10¢
Snell's Ship Auger Pattern Car Bits	dis 15¢ & 10¢

## Awl Hats.

Sewing, Brass Ferrule	dis 25¢ & 25¢
Patent Sewing, Short	dis 1.00 & 40¢ & 10¢
Patent Sewing, Long	dis 1.20 & 40¢ & 10¢
Patent Peg, Plain Top	dis 10.00 & 40¢ & 10¢
Patent Peg, Leather Top	dis 12.00 & 40¢ & 10¢

## Awls, Brad Sets, &c.

Awls, Sewing, Common	dis 1.70—dis 35¢
Awls, Shouldered Peg	dis 2.45—dis 40¢ & 10¢
Awls, Patent Peg	dis 2.70—dis 40¢ & 10¢
Awls, Shouldered Brad	dis 2.70 & 35¢
Awls, Handled Brad	dis 2.70 & 35¢
Awls, Handled Scratch	dis 2.70 & 35¢
Awls, Socket Scratch	dis 1.50 & 25¢ & 30¢

## Awl and Tool Sets.

Allen's Sets, Awls & Tools, No. 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	dis 10—dis 50¢ & 10¢
Allen's Ad. Tool Hds., Nos. 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 7 1/2, 8, 8 1/2, 9, 9 1/2, 10, 10 1/2, 11, 11 1/2, 12, 12 1/2, 13, 13 1/2, 14, 14 1/2, 15, 15 1/2, 16, 16 1/2, 17, 17 1/2, 18, 18 1/2, 19, 19 1/2, 20, 20 1/2, 21, 21 1/2, 22, 22 1/2, 23, 23 1/2, 24, 24 1/2, 25, 25 1/2, 26, 26 1/2, 27, 27 1/2, 28, 28 1/2, 29, 29 1/2, 30, 30 1/2, 31, 31 1/2, 32, 32 1/2, 33, 33 1/2, 34, 34 1/2, 35, 35 1/2, 36, 36 1/2, 37, 37 1/2, 38, 38 1/2, 39, 39 1/2, 40, 40 1/2, 41, 41 1/2, 42, 42 1/2, 43, 43 1/2, 44, 44 1/2, 45, 45 1/2, 46, 46 1/2, 47, 47 1/2, 48, 48 1/2, 49, 49 1/2, 50, 50 1/2, 51, 51 1/2, 52, 52 1/2, 53, 53 1/2, 54, 54 1/2, 55, 55 1/2, 56, 56 1/2, 57, 57 1/2, 58, 58 1/2, 59, 59 1/2, 60, 60 1/2, 61, 61 1/2, 62, 62 1/2, 63, 63 1/2, 64, 64 1/2, 65, 65 1/2, 66, 66 1/2, 67, 67 1/2, 68, 68 1/2, 69, 69 1/2, 70, 70 1/2, 71, 71 1/2, 72, 72 1/2, 73, 73 1/2, 74, 74 1/2, 75, 75 1/2, 76, 76 1/2, 77, 77 1/2, 78, 78 1/2, 79, 79 1/2, 80, 80 1/2, 81, 81 1/2, 82, 82 1/2, 83, 83 1/2, 84, 84 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World's Best. # gross, No. 1, \$12.00; No. 2 \$24.00.  
No. 3, \$36.00. dis 50&10  
Universal. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Domestic. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Champion. # gross, No. 1, \$12.00; No. 2, \$24.00.

**Cards.**  
Horse and Curry. dis 10 @ 10&10  
Cotton. New list, Aug., 1888, dis 10  
Wool. dis 10

**Carpet Stretchers.**  
Cast Steel, Polished. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Cast Iron, Steel Points. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Socket. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Bullard. dis 25 @ 25&10

**Carpet Sweepers.**  
Bissell No. 5. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Bissell No. 7 New Drop Pan. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Bissell Grand. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Grand Rapid. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Crown Jewel. No. 1, \$18; No. 2, \$19; No. 3, \$20.  
Magic. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Jewel. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Mystic. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Cottage. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Garland. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Parlor Queen. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Housewife's Delight. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Queen. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Queen, with band. # gross, No. 1, \$12.00; No. 2, \$24.00.  
King. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Weed Improved. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Hub. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Cog Wheel. # gross, No. 1, \$12.00; No. 2, \$24.00.

**Cartridges—See Ammunition.**  
**Casters.**  
Bed. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Plate. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Shallow Socket. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Deep Socket. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Yale Casters, list May, 1888. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Yale, Gem. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Martin's Patent (Phoenix). # gross, No. 1, \$12.00; No. 2, \$24.00.  
Payson's Anti-Friction. # gross, No. 1, \$12.00; No. 2, \$24.00.  
"Giant" Truck Casters. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Stationary Truck Casters. # gross, No. 1, \$12.00; No. 2, \$24.00.

**Cattle Lenders.**  
Humason, Beckley & Co.'s. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Sargent's. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Hotchkiss. # gross, No. 1, \$12.00; No. 2, \$24.00.  
Peck Stow & W. Co. # gross, No. 1, \$12.00; No. 2, \$24.00.

**Chains.**  
Trace, 3/4-10-8, exact sizes, # pair, \$1.03; dis 50&10&5  
Trace, 3/4-10-8, exact sizes, # pair, .92; dis 50&10&5  
Trace 7-10-2, exact sizes, # pair, 1.11; dis 50&10&5  
NOTE.—Traces, "Regular" sizes 3/4 net # pair less than exact.

Log, Fifth, Stretcher, and other fancy Chains, list  
Nov. 1, 1888. # gross, No. 1, \$12.00; No. 2, \$24.00.  
American Coll 3-16 M. 5-16 7-16 9-16 11-16 13-16 15-16 17-16 19-16 21-16 23-16 25-16 27-16 29-16 31-16 33-16 35-16 37-16 39-16 41-16 43-16 45-16 47-16 49-16 51-16 53-16 55-16 57-16 59-16 61-16 63-16 65-16 67-16 69-16 71-16 73-16 75-16 77-16 79-16 81-16 83-16 85-16 87-16 89-16 91-16 93-16 95-16 97-16 99-16 101-16 103-16 105-16 107-16 109-16 111-16 113-16 115-16 117-16 119-16 121-16 123-16 125-16 127-16 129-16 131-16 133-16 135-16 137-16 139-16 141-16 143-16 145-16 147-16 149-16 151-16 153-16 155-16 157-16 159-16 161-16 163-16 165-16 167-16 169-16 171-16 173-16 175-16 177-16 179-16 181-16 183-16 185-16 187-16 189-16 191-16 193-16 195-16 197-16 199-16 201-16 203-16 205-16 207-16 209-16 211-16 213-16 215-16 217-16 219-16 221-16 223-16 225-16 227-16 229-16 231-16 233-16 235-16 237-16 239-16 241-16 243-16 245-16 247-16 249-16 251-16 253-16 255-16 257-16 259-16 261-16 263-16 265-16 267-16 269-16 271-16 273-16 275-16 277-16 279-16 281-16 283-16 285-16 287-16 289-16 291-16 293-16 295-16 297-16 299-16 301-16 303-16 305-16 307-16 309-16 311-16 313-16 315-16 317-16 319-16 321-16 323-16 325-16 327-16 329-16 331-16 333-16 335-16 337-16 339-16 341-16 343-16 345-16 347-16 349-16 351-16 353-16 355-16 357-16 359-16 361-16 363-16 365-16 367-16 369-16 371-16 373-16 375-16 377-16 379-16 381-16 383-16 385-16 387-16 389-16 391-16 393-16 395-16 397-16 399-16 401-16 403-16 405-16 407-16 409-16 411-16 413-16 415-16 417-16 419-16 421-16 423-16 425-16 427-16 429-16 431-16 433-16 435-16 437-16 439-16 441-16 443-16 445-16 447-16 449-16 451-16 453-16 455-16 457-16 459-16 461-16 463-16 465-16 467-16 469-16 471-16 473-16 475-16 477-16 479-16 481-16 483-16 485-16 487-16 489-16 491-16 493-16 495-16 497-16 499-16 501-16 503-16 505-16 507-16 509-16 511-16 513-16 515-16 517-16 519-16 521-16 523-16 525-16 527-16 529-16 531-16 533-16 535-16 537-16 539-16 541-16 543-16 545-16 547-16 549-16 551-16 553-16 555-16 557-16 559-16 561-16 563-16 565-16 567-16 569-16 571-16 573-16 575-16 577-16 579-16 581-16 583-16 585-16 587-16 589-16 591-16 593-16 595-16 597-16 599-16 601-16 603-16 605-16 607-16 609-16 611-16 613-16 615-16 617-16 619-16 621-16 623-16 625-16 627-16 629-16 631-16 633-16 635-16 637-16 639-16 641-16 643-16 645-16 647-16 649-16 651-16 653-16 655-16 657-16 659-16 661-16 663-16 665-16 667-16 669-16 671-16 673-16 675-16 677-16 679-16 681-16 683-16 685-16 687-16 689-16 691-16 693-16 695-16 697-16 699-16 701-16 703-16 705-16 707-16 709-16 711-16 713-16 715-16 717-16 719-16 721-16 723-16 725-16 727-16 729-16 731-16 733-16 735-16 737-16 739-16 741-16 743-16 745-16 747-16 749-16 751-16 753-16 755-16 757-16 759-16 761-16 763-16 765-16 767-16 769-16 771-16 773-16 775-16 777-16 779-16 781-16 783-16 785-16 787-16 789-16 791-16 793-16 795-16 797-16 799-16 801-16 803-16 805-16 807-16 809-16 811-16 813-16 815-16 817-16 819-16 821-16 823-16 825-16 827-16 829-16 831-16 833-16 835-16 837-16 839-16 841-16 843-16 845-16 847-16 849-16 851-16 853-16 855-16 857-16 859-16 861-16 863-16 865-16 867-16 869-16 871-16 873-16 875-16 877-16 879-16 881-16 883-16 885-16 887-16 889-16 891-16 893-16 895-16 897-16 899-16 901-16 903-16 905-16 907-16 909-16 911-16 913-16 915-16 917-16 919-16 921-16 923-16 925-16 927-16 929-16 931-16 933-16 935-16 937-16 939-16 941-16 943-16 945-16 947-16 949-16 951-16 953-16 955-16 957-16 959-16 961-16 963-16 965-16 967-16 969-16 971-16 973-16 975-16 977-16 979-16 981-16 983-16 985-16 987-16 989-16 991-16 993-16 995-16 997-16 999-16 1001-16 1003-16 1005-16 1007-16 1009-16 1011-16 1013-16 1015-16 1017-16 1019-16 1021-16 1023-16 1025-16 1027-16 1029-16 1031-16 1033-16 1035-16 1037-16 1039-16 1041-16 1043-16 1045-16 1047-16 1049-16 1051-16 1053-16 1055-16 1057-16 1059-16 1061-16 1063-16 1065-16 1067-16 1069-16 1071-16 1073-16 1075-16 1077-16 1079-16 1081-16 1083-16 1085-16 1087-16 1089-16 1091-16 1093-16 1095-16 1097-16 1099-16 1101-16 1103-16 1105-16 1107-16 1109-16 1111-16 1113-16 1115-16 1117-16 1119-16 1121-16 1123-16 1125-16 1127-16 1129-16 1131-16 1133-16 1135-16 1137-16 1139-16 1141-16 1143-16 1145-16 1147-16 1149-16 1151-16 1153-16 1155-16 1157-16 1159-16 1161-16 1163-16 1165-16 1167-16 1169-16 1171-16 1173-16 1175-16 1177-16 1179-16 1181-16 1183-16 1185-16 1187-16 1189-16 1191-16 1193-16 1195-16 1197-16 1199-16 1201-16 1203-16 1205-16 1207-16 1209-16 1211-16 1213-16 1215-16 1217-16 1219-16 1221-16 1223-16 1225-16 1227-16 1229-16 1231-16 1233-16 1235-16 1237-16 1239-16 1241-16 1243-16 1245-16 1247-16 1249-16 1251-16 1253-16 1255-16 1257-16 1259-16 1261-16 1263-16 1265-16 1267-16 1269-16 1271-16 1273-16 1275-16 1277-16 1279-16 1281-16 1283-16 1285-16 1287-16 1289-16 1291-16 1293-16 1295-16 1297-16 1299-16 1301-16 1303-16 1305-16 1307-16 1309-16 1311-16 1313-16 1315-16 1317-16 1319-16 1321-16 1323-16 1325-16 1327-16 1329-16 1331-16 1333-16 1335-16 1337-16 1339-16 1341-16 1343-16 1345-16 1347-16 1349-16 1351-16 1353-16 1355-16 1357-16 1359-16 1361-16 1363-16 1365-16 1367-16 1369-16 1371-16 1373-16 1375-16 1377-16 1379-16 1381-16 1383-16 1385-16 1387-16 1389-16 1391-16 1393-16 1395-16 1397-16 1399-16 1401-16 1403-16 1405-16 1407-16 1409-16 1411-16 1413-16 1415-16 1417-16 1419-16 1421-16 1423-16 1425-16 1427-16 1429-16 1431-16 1433-16 1435-16 1437-16 1439-16 1441-16 1443-16 1445-16 1447-16 1449-16 1451-16 1453-16 1455-16 1457-16 1459-16 1461-16 1463-16 1465-16 1467-16 1469-16 1471-16 1473-16 1475-16 1477-16 1479-16 1481-16 1483-16 1485-16 1487-16 1489-16 1491-16 1493-16 1495-16 1497-16 1499-16 1501-16 1503-16 1505-16 1507-16 1509-16 1511-16 1513-16 1515-16 1517-16 1519-16 1521-16 1523-16 1525-16 1527-16 1529-16 1531-16 1533-16 1535-16 1537-16 1539-16 1541-16 1543-16 1545-16 1547-16 1549-16 1551-16 1553-16 1555-16 1557-16 1559-16 1561-16 1563-16 1565-16 1567-16 1569-16 1571-16 1573-16 1575-16 1577-16 1579-16 1581-16 1583-16 1585-16 1587-16 1589-16 1591-16 1593-16 1595-16 1597-16 1599-16 1601-16 1603-16 1605-16 1607-16 1609-16 1611-16 1613-16 1615-16 1617-16 1619-16 1621-16 1623-16 1625-16 1627-16 1629-16 1631-16 1633-16 1635-16 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No. 174, \$87.75; No. 175, \$88.25; No. 176, \$88.75; No. 177, \$89.25; No. 178, \$89.75; No. 179, \$90.25; No. 180, \$90.75; No. 181, \$91.25; No. 182, \$91.75; No. 183, \$92.25; No. 184, \$92.75; No. 185, \$93.25; No. 186, \$93.75; No. 187, \$94.25; No. 188, \$94.75; No. 189, \$95.25; No. 190, \$95.75; No. 191, \$96.25; No. 192, \$96.75; No. 193, \$97.25; No. 194, \$97.75; No. 195, \$98.25; No. 196, \$98.75; No. 197, \$99.25; No. 198, \$99.75; No. 199, \$100.25; No. 200, \$100.75; No. 201, \$101.25; No. 202, \$101.75; No. 203, \$102.25; No. 204, \$102.75; No. 205, \$103.25; No. 206, \$103.75; No. 207, \$104.25; No. 208, \$104.75; No. 209, \$105.25; No. 210, \$105.75; No. 211, \$106.25; No. 212, \$106.75; No. 213, \$107.25; No. 214, \$107.75; No. 215, \$108.25; No. 216, \$108.75; No. 217, \$109.25; No. 218, \$109.75; No. 219, \$110.25; No. 220, \$110.75; No. 221, \$111.25; No. 222, \$111.75; No. 223, \$112.25; No. 224, \$112.75; No. 225, \$113.25; No. 226, \$113.75; No. 227, \$114.25; 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**Screw-Drivers.**—List, Brass, Jan. 27; Iron, July 1, 1887  
Flat Head Iron.....dis 70 4  
Round Head Iron.....dis 70 4  
Flat Head Brass.....dis 65 Ex. 10 % often  
Round Head Brass.....dis 60 given by  
Flat Head Bronze.....dis 65 jobbers.  
Round Head Bronze.....dis 60

**Machine.**  
Flat Head, Iron.....dis 55  
Round Head, Iron.....dis 50  
**Bench and Hand—**  
Bench, Iron.....dis 55 10 @ 55 10 10 10  
Bench, Wood, Hickory.....dis 22 25  
Bench, Wood, Beech.....dis 20 10  
Flat Head, Iron.....dis 40 @ 25 10 10  
Laz, Blunt Point.....dis 75 @ 75 10 10  
Coach and Lag, Gimlet Point.....dis 75 75  
Bed.....dis 25 25  
Hand Rail, Sargent's.....dis 60 10 10  
Hand Rail, Humason, Beckley & Co.'s.....dis 70 10 10 75  
Hand Rail, Co. Japaned.....dis 50 10 10  
Jack Screws, Millers Falls List.....dis 50 10 10  
Jack Screws, P. S. & W.....dis 35 35  
Jack Screws, Sargent.....dis 60 10 10 60 10 10  
Jack Screws, Stevens.....dis 40 @ 40 10 10

**Scroll Saws.**  
Larger, complete, \$10.00.....dis 25 25  
Rococo, complete, \$4.00.....dis 25 25  
**Scythe Sheaths.**.....dis 60 10 10

**Shears.**  
American (Cast) Iron.....dis 75 10 10 @ 75 10 10 10  
Pruning.....See Pruning Hooks and Shears  
Bernard's Lamp Trimmers.....dis 37 75  
Beymour's, List, Dec. 1881 dis 60 10 10 10 60 10 10 10  
Heinrich's, List, Dec. 1881 dis 60 10 10 10 60 10 10 10  
Heinrich's Tailor's Shears.....dis 39 10 10  
First quality C. S. Trimmers.....dis 80 10 10 10  
Second quality C. S. Trimmers.....dis 80 10 10 10 80 10 10 10  
Diamond Cast Shear.....dis 10 10 10  
Clipper.....dis 10 10 10  
Victor Cast Shears.....dis 75 10 10 @ 75 10 10 10  
Howe Bros. & Hulbert, Solid Forged Steel.....dis 40 40  
Cleveland Machine Co. Solid Steel Forged.....dis 70 70  
Clausen Shear Co., Nickel'd, same list.....dis 70 70

**Shovels.**  
**Shovel Door—**  
M. W. & Co., list Jan. 1, 1887.....dis 60 10 10 @ 60 10 10 10  
R. & E. list Dec. 18, 1885.....dis 55 10 10  
Corbin's list.....dis 60 10 10 10  
Patent Roller.....dis 60 10 10 10  
Patent Roller, Hatfield's.....dis 75 75  
Russell's Anti-Friction, list Dec. 18, 1885.....dis 60 10 10  
Moore's Anti-Friction.....dis 60 60

**Shiding Shutter—**  
R. & E. list Dec. 18, 1885.....dis 60 10 10 10  
Reading list.....dis 60 10 10 10

**Ship Tools.**  
L. & J. White.....dis 30 10 10  
Albertson Mfg. Co.....dis 25 25

**Shoes, Horse, Mule, &c.**  
Burden's, Perkins', Phoenix, at factory.....\$4.00  
Mule—Add 1¢ per kg to above prices.  
**Ox, Wrought—**  
Ton lots.....dis 90 90  
1000 lb lots.....dis 90 90  
500 lb lots.....dis 90 90  
Drop, 1 bag, 25 lb.....dis 11 25  
Drop, 1 bag, 5 lb.....dis 6 00  
Buck and Chilled, 5 lb bag.....dis 11 50  
Buck and Chilled, 5 lb bag.....dis 35 35

**Shovels and Spades.**  
Ames' Shovels, Spades, &c., list Nov. 1, 1885.....dis 20 20  
**NOTE.**—Jobbers frequently give 5 @ 7 1/2 % extra on

**Grinth's Black Iron.....dis 50 10 10  
Grinth's C. S.....dis 60 @ 60 10 10  
Grinth's Solid Cast Steel R. R. Goods.....dis 20 20  
Old Colony (Sanford Fork & Tool Co.).....dis 15 @ 15 7 1/2  
Hubbard & Co.....dis 15 @ 15 25  
Lehigh Mfg. Co.....dis 60 10 10  
Payne Pettibone & Son, list January, 1886.....dis 30 30  
Remington's (Lowman's Patent).....dis 30 10 10 @ 30 10 10 10  
Rowland's, Black Iron.....dis 60 10 10 @ 60 10 10 10  
Rowland's Steel.....dis 60 10 10 @ 60 10 10 10**

**Shovels and Tongs.**  
Iron, P. S. & W.....dis 60 10 10 60 10 10 10  
Brass Head.....dis 60 10 10 10

**Skins, Thimble.**  
Western list.....dis 75 10 10 @ 75 10 10 10  
Columbus Wrt. Steel, list Nov. 1, 1887.....dis 20 20  
Coldbrookdale Iron Co.....dis 50 10 10  
Utica P. S. T. Skins.....dis 60 60  
Utica Turned and Fitted.....dis 35 35

**Buffalo Metallic, B. S. & Co., new list.....dis 50 10 10 10  
Barler Flour Sifters.....dis 20 20  
Smith's Adjustable Sifters.....dis 22 25  
Smith's Adjustable Mill Strainer.....dis 20 20  
Smith's Adjustable F. & C. Strainer.....dis 60 10 10 10  
Meat 18, Nested, 7 doz.....dis 70 70  
Meat 20, Nested, 7 doz.....dis 85 10 10  
Meat 24, Nested, 7 doz.....dis 100 100  
Blades—School, by case.....dis 50 10 10**

**Snaps, Harness, &c.**  
Anchor & Mfg Co.....dis 65 65  
Pick's (Bristol).....dis 50 10 10  
Hotchkiss.....dis 10 10  
Andrews.....dis 60 60  
Sargent's Patent Guarded.....dis 70 10 10 10  
German, new list.....dis 40 10 10  
Covert.....dis 60 10 10  
Everette Patent Guard.....dis 50 10 10 10  
Covert New R. E.....dis 60 10 10  
Covert Spring.....dis 60 10 10 10

**Soldering Irons.**  
Covert's Adjustable, list Jan. 1, 1886.....dis 55 10 10  
**Spoke Shaves.**—Iron.....dis 45 45  
Woods' list.....dis 50 10 10  
Bulley's list.....dis 40 10 10  
Stearns.....dis 20 10 10 @ 20 10 10 10

**Spoke Trimmers.**  
Bonney's.....dis 10 10 10, dis 50 50  
Stearns.....dis 10 10 10, dis 50 50  
Trevelyan.....dis 10 10 10, dis 50 50  
Douglas.....dis 10 10 10, dis 50 50

**Spoons and Forks.**  
**Tinned Iron—**  
Basting, Central Stamping Co.'s list, dis 70 10 10 10  
Basting Table and Tea, Central Stamping Co.'s list, dis 70 10 10 10  
Buffalo & Co.....dis 39 10 10 10  
Silver-Plated—4 mos. or 5 % cash 31 days.....dis 50 50  
Meriden Brit. Co., Rogers.....dis 50 50  
C. Rogers & Bros.....dis 50 50  
Rogers & Bros.....dis 50 50  
Reynolds.....dis 50 50  
Wm. Rogers Mfg. Co.....dis 50 @ 50 10 10  
Simpson, Hall, Miller & Co.....dis 50 @ 50 10 10

**Holmes & Edwards Silver Co.,**.....dis 50 @ 50 10 10  
H. & E. Silver Co., Mexican Silver.....dis 50 10 10  
German Silver Co., Durham Silver.....dis 50 @ 50 10 10  
German Silver, Hall & Elton.....dis 40 10 10  
Nickel Silver.....dis 50 10 10 50 10 10 10  
Britannia.....dis 50 10 10  
Boardman's Flat Wave.....dis 50 10 10  
Boardman's Nickel Silver.....dis 50 10 10  
Boardman's Brit'n Silver Spoons, case lots.....dis 50 10 10 10

**Spring.**  
Elliptic, Concord, Platform and Half Scroll.....dis 60 @ 60 10 10  
Chl'r's Bolster Springs.....dis 25 25

**Stools and Iron.**  
Nickel-Plated.....dis 75 @ 75 10 10 10  
Try Square and T Bevels.....dis 60 10 10 10 @ 70 70  
Dixson's Try Square and T Bevels.....dis 45 10 10  
Dixson's Try Square and T Miter.....dis 50 10 10

**Staples.**  
Fence Staples, Galvanized } Same price as Barb Wire.  
Fence Staples, Plain } See Trade Report.  
Steel Yards.....dis 40 10 10 10 50 50

**Stocks and Dies.**  
Blacksmith's, Waterford Goods.....dis 30 10 10 @ 30 10 10 10  
Lightning Plate.....dis 25 @ 25 30 30  
Reece's New Screw Plates.....dis 35 10 10 @ 35 10 10 10

**Stone.**  
Hindustan No. 1, 3/4; Axe, 5/4; Slips No. 1, 5/4.....dis 25 25  
Sand Stone.....dis 1 1 @ 22 22  
Washita Stone, No. 1.....dis 1 1 @ 22 22  
Washita Stone, No. 2.....dis 1 1 @ 22 22  
Washita Slips, No. 1 Extra.....dis 1 1 @ 42 42  
Washita Slips, No. 1.....dis 1 1 @ 30 30  
Arkansas Stone, No. 1, 4 to 6 in.....dis 1 1 @ 35 35  
Arkansas Stone, No. 1, 6 to 9 in.....dis 1 1 @ 40 40  
Turkey Oil Stone.....dis 1 1 @ 30 30  
Turkey Slips.....dis 1 1 @ 10 10 @ 10 10 10  
Lake Superior, Chase.....dis 1 1 @ 16 16  
Lake Superior Slips, Chase.....dis 1 1 @ 31 31  
Seneca Stone, Red Paper Brand, 1/2.....dis 18 @ 20 20  
Seneca Stone, High Rounds, 1/2.....dis 20 @ 25 25  
Columbia Stone, Small Whets, 1/2 gro.....dis 24 24

**Stone Polish.**  
Joseph Dixon's.....dis 60 10 10, dis 10 10  
Gem.....dis 60 10 10, dis 10 10  
Gold Medal.....dis 60 10 10, dis 10 10  
Mirror.....dis 60 10 10, dis 10 10  
Luby.....dis 60 10 10, dis 10 10  
Rising Sun, 5 gro. lots.....dis 60 10 10, dis 10 10  
Dixon's Plumbago.....dis 60 10 10, dis 10 10  
Bartons' Noon Day, 1/2 gro.....dis 60 10 10, dis 10 10  
Pavon's Pride Stove Enamel.....dis 60 10 10, dis 10 10  
Yates' Liquid.....dis 60 10 10, dis 10 10  
Yates' Standard Paste Polish, 10-lb cans, per lb, 15¢  
Jet Black.....dis 60 10 10, dis 10 10  
Japanese.....dis 60 10 10, dis 10 10  
Pyralide.....dis 60 10 1

## CURRENT METAL PRICES.

JULY 18, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

## IRON AND STEEL

### Bar Iron from Store.

Common Iron from Store.	
¾ to 2 in. round and square. }	
1 to 6 in. x ¾ to 1 in. ....	10 lb 1.90 @ 2.00¢
Refined Iron	
¾ to 2 in. round and square. }	
1 to 4 in. x ¾ to 1 ½ in. ....	10 lb 2.10 @ 2.25¢
4 ½ to 6 in. x ¾ to 1 in. ....	
1 to 6 in. x ¾ and 5-16	10 lb 2.30 @ 2.45¢
Rods—¾ and 1-16 round and sq.	10 lb 2.20 @ 2.35¢
Bands—1 to 6 x 3-16 to No. 12	10 lb 2.30 @ 2.45¢
"Burden Best" Iron, base price.	10 lb 3.00 @ ... ¢
Burden's "H. B. & S." Iron, base	
"Elster" .....	10 lb 2.80 @ ... ¢
"Uster" .....	10 lb 3.10 @ ... ¢
Norway Rods .....	4.00 @ 5.00¢

**Merchant Steel from Store.**

Open-Hearth and Bessemer Machinery,  
Toe Calk, Tire and Sleigh Shoe, base  
price in small lots.....2½¢ @ 3¢  
Best Cast Steel, base price in small lots 8½¢ @ 9¢  
Best Cast Steel Machinery, base price in  
small lots.....5½¢ @ 6¢

For Classification and Extras adopted by the Mer-  
chant Steel Association of the United States, June 1,  
1888, see *The Iron Age*, June 21, 1888.

### Sheet Iron from Store.

Common American.		E. G. Cleaned.	
10 to 16.....	3.75 @ 2.80	3.25 @	
17 to 20.....	3.50 @ 3.00	3.50 @	3.50
21 to 24.....	3.25 @ 3.10	3.25 @	
25 and 26.....	3.00 @	3.50 @	
27.....	3.35 @	3.75 @	
28.....	3.50 @	4.00 @	
B. B.			
Galv'd, 14 to 20.....	4.50 @	4.38 @	qual.
Galv'd, 21 to 24.....	4.87 1/2 @	4.75 @	
Galv'd, 25 to 26.....	5.25 @	5.12 @	
Galv'd, 27.....	5.62 1/2 @	5.48 @	
Galv'd, 28.....	6.00 @	5.85 @	
Patent Finished.....		B. A 104.....	B. 94.....
Russia.....		B. 94.....	@ 104.....
American Cold Rolled B. B.....		B. 5.....	@ 104.....

### English Steel from Store

Best Cast	15
Extra Cast	16
Swaged Cast	16
Best Double Shear	15
Blister, 1st quality	12
German Steel, Best	10
2d quality	9
3d quality	8
Sheet Cast Steel, 1st quality	14
2d quality	14
3d quality	12

**METALS.**

**THE**

	Tin.	Per M
Banca, Pigs.	.....	246
Straits, Pigs.	.....	237
English, Pigs.	.....	236
Straits in Bars	.....	236

### Tin Plates.

		Charcoal Plates—Bright.		Per box
Melyn Grade.	IC	10	14	\$6.00
"	IC	12	18	6.25
"	IC	14	20	6.00
"	IC	20	28	12.50
"	IX	10	14	7.50
"	IX	12	18	7.75
"	IX	14	20	7.50
"	IX	20	28	15.50
"	DC	12 1/2	17	5.50 @
"	DX	12 1/2	17	7.00 @
Calland Grade.	IC	10	14	\$6.00
"	IC	12	18	6.25
"	IC	14	20	6.00
"	IX	10	14	7.50
"	IX	12	18	7.75
"	IX	14	20	7.50
Allaway Grade.	IC	10	14	\$5.25 @
"	IC	12	18	5.50 @
"	IC	14	20	5.25 @
"	IC	20	28	10.75 @
"	IX	10	14	6.25 @
"	IX	12	18	6.50 @
"	IX	14	20	6.25 @
"	IX	20	28	12.50 @
"	DC	12 1/2	17	5.00 @
"	DX	12 1/2	17	6.00 @

*Sheet and Bolt.*

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

[illegible]

All Bath Tub Sheets.....	16 oz.	14 oz.	12 oz.	10 oz.
Per pound.....	\$0.58	0.80	0.92	0.35
Boiler Copper, $\frac{3}{8}$ inch diameter and over, per pound.....	.....	.....	.....	35¢
Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.				
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the fore- going prices.				
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the fore- going prices.				

## toms, Fits and Flats. Pe

14 ounce to square foot and heavier.....	1¢ per pound.....
12 ounce and up to 14 ounce to square foot.....	25¢
10 ounce and up to 12 ounce.....	31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

### Tinning

<i>Tinning.</i>	
Tinning sheets on one side, 10, 12 and 14 x 48 each.....	30¢
Tinning sheets on one side, 30 x 60 each.....	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.....	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each.....	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each.....	12¢
Tinning sheets on one side, other sizes, per square foot.....	2½¢
For tinning both sides double the above prices.	
<i>Planned Copper.</i>	
Planned Copper List May 5, 1888.....	Net

### Brass and Copper Tubes

Seamless Copper.			Seamless Brass.		
Weight.	Per Inch.	Per Foot.	Weight.	Per Inch.	Per Foot.
1/2	1.50	18.00	1/2	1.47	17.64
3/4	2.25	27.00	3/4	2.20	26.40
1	3.00	36.00	1	2.97	35.64
1 1/4	4.50	54.00	1 1/4	4.41	52.92
1 1/2	5.25	63.00	1 1/2	5.18	62.16
2	7.00	84.00	2	6.93	83.16
2 1/2	8.75	105.00	2 1/2	8.68	104.16
3	10.50	126.00	3	10.41	124.92
3 1/2	12.25	147.00	3 1/2	12.16	145.92
4	14.00	168.00	4	13.93	167.16
4 1/2	15.75	189.00	4 1/2	15.68	188.16
5	17.50	210.00	5	17.41	208.92
5 1/2	19.25	231.00	5 1/2	19.16	229.92
6	21.00	252.00	6	20.93	251.16
6 1/2	22.75	273.00	6 1/2	22.68	272.16
7	24.50	294.00	7	24.41	293.16
7 1/2	26.25	315.00	7 1/2	26.16	314.16
8	28.00	336.00	8	27.93	335.16
8 1/2	29.75	357.00	8 1/2	29.68	356.16
9	31.50	378.00	9	31.41	377.16
9 1/2	33.25	399.00	9 1/2	33.16	398.16
10	35.00	420.00	10	34.93	419.16
10 1/2	36.75	441.00	10 1/2	36.68	440.16
11	38.50	462.00	11	38.41	461.16
11 1/2	40.25	483.00	11 1/2	40.16	482.16
12	42.00	504.00	12	41.93	503.16
12 1/2	43.75	525.00	12 1/2	43.68	524.16
13	45.50	546.00	13	45.41	545.16
13 1/2	47.25	567.00	13 1/2	47.16	566.16
14	49.00	588.00	14	48.93	587.16
14 1/2	50.75	609.00	14 1/2	50.68	608.16
15	52.50	630.00	15	52.41	629.16
15 1/2	54.25	651.00	15 1/2	54.16	650.16
16	56.00	672.00	16	55.93	671.16
16 1/2	57.75	693.00	16 1/2	57.68	692.16
17	59.50	714.00	17	59.41	713.16
17 1/2	61.25	735.00	17 1/2	61.16	734.16
18	63.00	756.00	18	62.93	755.16
18 1/2	64.75	777.00	18 1/2	64.68	776.16
19	66.50	798.00	19	66.41	797.16
19 1/2	68.25	819.00	19 1/2	68.16	818.16
20	70.00	840.00	20	69.93	839.16
20 1/2	71.75	861.00	20 1/2	71.68	860.16
21	73.50	882.00	21	73.41	881.16
21 1/2	75.25	903.00	21 1/2	75.16	902.16
22	77.00	924.00	22	76.93	923.16
22 1/2	78.75	945.00	22 1/2	78.68	944.16
23	80.50	966.00	23	80.41	965.16
23 1/2	82.25	987.00	23 1/2	82.16	986.16
24	84.00	1008.00	24	83.93	1007.16
24 1/2	85.75	1029.00	24 1/2	85.68	1028.16
25	87.50	1050.00	25	87.41	1049.16
25 1/2	89.25	1071.00	25 1/2	89.16	1070.16
26	91.00	1092.00	26	90.93	1091.16
26 1/2	92.75	1113.00	26 1/2	92.68	1112.16
27	94.50	1134.00			

### Roll and Sheet Brass.

Discount from list.....	10 @ 15 %
<b>Spelter.</b>	
Duty: Pig. Bars and Plates, \$1.50 @ 100 lb.	
Western Spelter. ....	5 @ 51¢
"Bergenport" .....	3¢
"Rortha" .....	7 1/2¢

Corporation Cocks, "Mueller" Pattern, from	55¢ 10¢ 2
Wrench, 1st., Shampooing Cocks	55¢ 10¢ 2
Ground Basin Cocks	50¢ 10¢ 2
Compression Basin Cocks	50¢ 10¢ 2
Compression Basin and Sink Cocks	50¢ 10¢ 2
Compression Pantry Cocks	50¢ 10¢ 2
Compression Double Basin and Shampooing Cocks	50¢ 10¢ 2
Compression Double Bath Cocks	50¢ 10¢ 2
Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks	50¢ 10¢ 2
Basin Plugs and Basin Grates	55¢ 10¢ 2
Bath and Wash Tray Plugs	55¢ 10¢ 2
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets	55¢ 10¢ 2
Basin Clamps, Basin Joints and Strainers	55¢ 10¢ 2
Eller Couplings, Ground Face, per	\$1.25
Boiler Couplings, Plain Face, per	\$1.90
Water Back Valve and Plain Couplings, Soldering Nipples and Unions	55¢ 10¢ 2
Union Joints	60¢ 10¢ 2
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides	55¢ 10¢ 2
Hose Goods	55¢ 10¢ 2

**Steam and Gas Fitters' Brass and Iron Work.**

	Discount per cent.
Brass Globe Valves.....	60 & 10 & 2
Finished Brass Globe Valves, with Finished Brass Wheels.....	40 & 10 & 2
Brass Globe Valves, with Patent Wood Wheels.....	60 & 10 & 2
Brass Globe Angie and Corner Valves.....	60 & 10 & 10 & 2
Brass Radiator Angle Valves.....	60 & 10 & 2
Brass Radiator Angle Valves, Frink's Patent.....	60 & 10 & 2
Brass Cross and Check Valves.....	60 & 10 & 2
Brass Check Valves.....	60 & 10 & 2
Brass Hose Valves.....	60 & 10 & 2
Brass and Iron Frink Valves.....	60 & 10 & 2
Brass Safety Valves.....	60 & 10 & 2
Brass Vacuum Valves.....	50 & 10 & 2
Brass Whistle Valves.....	60 & 10 & 2
Brass Balance, Back Pressure and Foot Valves.....	50 & 10 & 2
Brass Butterfly and Throttle Valves.....	50 & 10 & 2
Brass Pump Valves.....	50 & 10 & 2
Brass Steam Cocks.....	60 & 10 & 2
Brass Service, Meter and Union Meter Cocks.....	57 1/2 & 10 & 2
Brass Whistles, Water Gauges and Oil Cups.....	60 & 10 & 2
Brass Hollow Plug, Tallow and Globe Oil Cups.....	50 & 10 & 2
Brass Lubricators.....	60 & 10 & 2
Brass Air Valves.....	60 & 10 & 2
Brass Air Cocks.....	60 & 10 & 2
Brass Gauge Cocks.....	55 & 10 & 2
Brass Cylinder Cocks and Steam Bibbs.....	50 & 10 & 2
Brass Swing Joints and Expansion Joints.....	50 & 10 & 2
Brass Test Pumps.....	50 & 10 & 2
Brass Steam Fittings, Rough.....	60 & 10 & 2
Brass Steam Fittings, Finished.....	50 & 10 & 2
Brass Union Joints.....	60 & 10 & 2
Brass Soldering Unions and Nipples.....	55 & 10 & 2
Brass Hose Fittings, Fusible and Plugs.....	55 & 10 & 2
Iron Body Globe, Angie, Cross and Valves.....	65 & 10 & 2
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.....	65 & 10 & 2
Iron Cocks, all Iron.....	65 & 10 & 2
All Iron Valves.....	65 & 10 & 2

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Miscellaneous.		Discount per cent.
Cast Iron Fittings.....	.....	70 & 10
Plugs and Bushings.....	.....	75 & 10
Malleable Iron Unions...	.....	67 1/2
Malleable Iron Fittings.....	.....	75 & 10

.....

Paints.	
Black, Lamp—Coach Painters'.....	7 1/2 22 @ 246
Black, " Ordinary.....	15 @ 246
Black, Ivory Drop, fair.....	15 @ 154
Black, " best.....	39 @ 294
Black Paint, in oil.....	kegs, 84; assorted cans, 114
Blue, Prussian, fair to best.....	40 @ 554
Blue, " in oil.....	45 @ 554
Chinese dry.....	704
Ultramarine.....	18 @ 304
Brown, Spanish.....	10 @ 134
Van Dyke.....	10 @ 124
Dryers, Patent American, ass'd cans, 94;.....	15 @ 246
Green, Chrome.....	15 @ 246
Green, Chrome in oil.....	14 @ 18 @ 254
Green, Paris.....	good, 304; best, 354
Green, Paris in oil.....	good, 304; best, 354
Iron, ant, Bright Red.....	7 1/2 @ 246
Iron Paint, Brown.....	7 1/2 @ 144
Iron Paint, Purple.....	7 1/2 @ 34
Iron Paint, Ground in oil, Bright Red.....	7 1/2 @ 644
Iron Paint, Ground in oil, Red.....	7 1/2 @ 54
Iron Paint, Ground in oil, Brown.....	7 1/2 @ 544
Iron Paint, Ground, Purple.....	7 1/2 @ 84
Litharge.....	644
Mineral Paints.....	2 @ 46
Orange Mineral.....	104
Red Lead, American.....	644
Red Venetian (Eng.) dry.....	\$1.65 @ \$1.70
Red Venetian in oil.....	ass't'd cans, 114; kegs, 84
Red Indian Dry.....	9 @ 124
Rose Pink.....	10 @ 24